

Arboretum BULLETIN

A JOURNAL OF GENERAL HORTICULTURAL INFORMATION
PUBLISHED QUARTERLY BY THE UNIVERSITY OF WASHINGTON
ARBORETUM FOUNDATION • SEATTLE WASHINGTON

Winter, 1950

VOLUME XIII, NO. 4

Special Rhododendron Number

TABLE OF CONTENTS

In the Arboretum—	
Effects of Winter on Trees and Shrubs.....	B. O. Mulligan 1
Mt. Airy Arboretum, Cincinnati, Ohio.....	Harry A. Gray 6
Further Notes Concerning the Glenn Dale Azaleas....	B. Y. Morrison 7
Insect Pests of Rhododendrons.....	E. P. Breakey 9
About Rhododendron Varieties.....	J. Harold Clarke 12
Winter Takes Its Toll.....	Herbert G. Ihrig 14
Further Comments on Rhododendron Hybridizing..	Lester E. Brandt 15
Propagation of Rhododendrons.....	Endre Ostbo 17
Rhododendron Occidentale	E. J. Kraus 19
Winter Came and Went.....	John W. Schaefer 20
Notes and Comment.....	22
Book Reviews	24
Arboretum Notebook	26
Index to Volume XIII.....	37

For Dormant Spraying **PROTECT YOUR TREES & SHRUBS with this AMAZING RIX SPRAY**

Now You Can Control Powdery Mildew on Roses and Other Garden Plants

This wonderful garden spray gives astonishing protection against powdery mildew. Mr. John Paul Edwards, eminent rosarian, says, "I was able to completely control powdery mildew on my roses and produce outstanding luxuriant green foliage and an abundance of blooms . . . simply by use of RIX Spray."

Don't Neglect Peach Leaf Curl, Scale Insects, Red Spider Mites, Pear Scab, Red Berry Trouble

Now is the time to start your winter spray program—and plan on proper spring treatments—of your fruit trees and ornamentals. Help them fight off ugly fungi and pests that mar their health, stunt their growth, and reduce fruit size and quantity.

Take a tip from large growers—follow their time-tested commercial methods. Give your garden effective winter pest control with RIX Spray!



PRICES

Quart \$1.25

Gallon \$4.00

See any of Ernst Hardware Stores now for further information and literature on proper treatments.

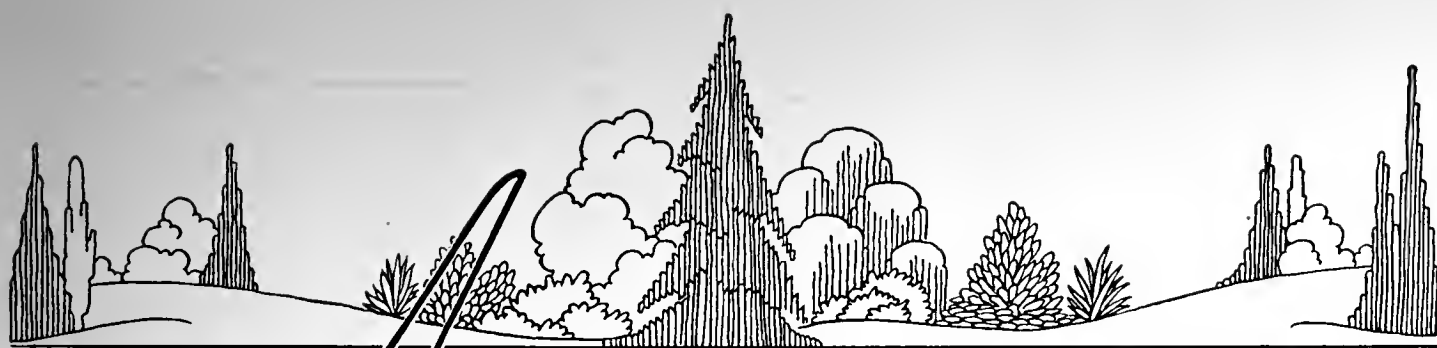
MAIN STORE — SIXTH AT PIKE

815 First Avenue
4873 Rainier Avenue
8505 Greenwood Avenue

333 Westlake North
Northgate
1916 North 45th Street
6322 Roosevelt Way

4524 California Avenue
2322 Market Street
Bellevue

ERNST HARDWARE CO.



The Arboretum Bulletin

VOLUME XIII

WINTER, 1950

NUMBER 4

In the Arboretum Effects of Winter on Trees and Shrubs

B. O. MULLIGAN*

IN THE REPORT on "Winter in the Arboretum," published in the Spring, 1950, issue of the BULLETIN, a few preliminary indications were given, accompanied by data on snowfall and temperatures, of the obvious damage suffered by various evergreen trees and shrubs in the Arboretum from the low temperatures and cold winds of late January and early February, 1950.

During the year several surveys have been made to determine and record the amount of damage and degree of recovery of the plants apparently most affected, and some observations have also been made on those lightly or not at all damaged, as the following reports on some of our principal plant groups and more interesting individual specimens will indicate.

Most of the damaged plants were young, having been planted during the past four years, but there were some exceptions to this: e.g., *Arbutus Unedo*, some of the Pines, *Camellia japonica* forms, and *Rhododendron arboreum*. Position in the Arboretum was only occasionally noted to influence the effects, e.g., *Pieris formosa*, and dead or damaged plants were to be found throughout the area. Fortunately, only a small fraction of those killed were unique specimens; most of the

less common examples are increased as soon as possible and not usually planted out until a younger generation exists.

Arctostaphylos

Planted on banks of light soil facing west or north.

Of fifteen species, only *A. glauca* and three hybrids of *A. densiflora* were killed, though a small plant of *A. obispoensis* was severely crippled. The following made good recovery from having their young growths killed: *A. Bakeri*, *A. glandulosa*, *A. Manzanita*, *A. Mariposa*, *A. pumila*, *A. Stanfordiana* and *A. viscida*. The last species suffered most severely. Unhurt were: *A. franciscana*, *A. montana*, the hybrid *A. media*, *A. nummularia* and, of course, *A. uva-ursi*. This is encouraging after such a test.

Camellias

These are planted in one of the higher parts of the Arboretum, in light soil well mulched with leaves. Plants generally 4 to 6 feet tall.

(a) Species

C. reticulata killed in the open, survived but very severely damaged on a west wall; both young plants.

C. Sasanqua damage varied according to site aspect and protection much as varieties of *C. japonica*.

C. oleifera, foliage somewhat scorched in sheltered position.

*Mr. Mulligan brings us the completed survey on the damage to plants in the Arboretum during last winter's severe weather, in place of his usual progress report.



C. saluenensis and *C. sinensis* slightly damaged.

C. japonica (type) unharmed; flowered and set fruits.

(b) Varieties of *C. japonica*.

In general, plants in exposed situations suffered worst, in the form of leaf scorching, eventual killing of shoots in some cases, and loss of buds. Those protected from the morning sun and from wind by evergreen trees were least affected, but varietal differences in hardiness were evident. More than thirty varieties flowered during the spring, but blooms were noticeably smaller than usual. Weather in March, when flowering usually begins in Seattle, was cooler than normal (average 1.6° F. less for the month) and exceptionally wet (7.23 inches of rain; normal 3.05 inches); in April, likewise, almost equally cooler than normal.

In most cases, except some plants cut down to the snow line in a particularly cold location, good new growth was made during the summer and into fall.

Undamaged:

Alba plena	Haku Botan
Chandleri	Haku Cho
Christmas Cheer	Lady Clare (under trees only)
compacta alba	
Debutante	Mathotiana
Ecstasy	Mrs. Wm. Thompson
Elena Nobile	Red Tricolor Sieboldii
Gunellii	(Wakanoura)
H. A. Downing	Wm. Hovey

Most Severely Damaged:

Chandleri rubra	Otome
Herme	Rainy Sun

Less Damaged:

Angelmannia	Fred Sander
Aurora	Governor Mouton
Cheerful	Madonna
Cherokee	Wilmetta
Empress of India	

A fuller account by Mr. Robert J. Hansen of the effect on our Camellias will be published in the American Camellia Society's Yearbook for 1950.

Ceanothus

Growing on a west slope in light stony soil, but at a low level close to Azalea Way. All



Loderi Valley, north side, looking northwest.

—Photo by E. F. Marten

plants young; oldest planted October, 1947. Killed:

C. arboreus, *C. austro-montanus*, *C. cuneatus*, *C. impressus*, *C. purpureus*, *C. "Theo. Payne."*

Severely Damaged, Cut to Snow Level:

C. "Delight," C. Lobbianus, *C. papillosus*, *C. thyrsiflorus* and var. *repens*.

Slightly Damaged:

C. Lemmonii, *C. rigidus*.

Planted on south side of greenhouses:

Killed:

C. arboreus, *C. cuneatus*, *C. Masonii*, *C. papillosus* var. *Roweanus* (seedling).

Slightly Damaged:

C. cordulatus

These losses were to be expected, except that no plants of *C. impressus* had previously been damaged and this year all were killed without exception. That *C. papillosus* survived was somewhat surprising, since it had been injured in the previous winter. *C. prostratus* on the rock garden was slightly scorched but not seriously.

Cistus and *Halimium*

Situated in an open position on sandy soil, but exposed to east and south.

Of thirteen species or hybrids of *Cistus* these were killed:

C. Aguilari and var. *maculatus*; *C. ladaniferus* var. *albiflorus*, three years old, excepting two plants severely damaged; *C. lusitanicus*, part of group only; *C. monspeliensis*, all save one; *C. Palhinhaei*; *C. varius*.

Killed to the snow line (6 to 8 inches above ground) but recovered satisfactorily:

C. crispatus; *C. hirsutus* var. *acutifolius*; *C. lusitanicus*, six plants of group; *C. purpureus*; *C. villosus*, and var. *prostratus*.

Slight damage:

C. crispus; *C. "Doris Hibberson,"* (probably *C. laurifolius* x *C. villosus*); *C. laurifolius*; *C. Palhinhaei* hybrids (unflowered).

Of six *Halimium* species on the same site few were killed and no entire groups. Weight of snow on the plants broke some down or opened up the center. Damaged in this way or having shoots frozen back were: *H. alysoides*; *H. halimifolium*; *H. lasianthum*; *H.*

ocymoides var. *lasiocladum*. *H. Libanotis* and *H. umbellatum*, being covered by snow, came through unharmed. Later growth in all has been excellent.

No helianthemums were lost, no doubt for the same reason.

Conifers

Several species of *Cupressus* planted in 1949 suffered severely in the Pinetum, on a ridge west of and above the Boulevard. *C. Forbesii*, from southern and Lower California, and a species collected by Ludlow & Sherriff (No. 12141) in southeast Tibet, possibly *C. torulosa*, were killed outright. *C. lusitanica* was severely hurt, the leaders being killed. *C. pygmaea*, from northern coastal California, survived with only the loss of shoot tips. *C. Bakeri*, native of southern Oregon and northern California at 4,000 to 5,000 feet, planted February, 1948, was unaffected.

Among established pines on the same site, planted 1937-38, we lost the Aleppo Pine, *P. halepensis*, 7 to 8 feet high; Monterey pine, about 30 feet, and two trees out of a group of five 20- to 30-foot Bishop pine (*P. muricata*); the last two are coastal California species. The foliage of the Knobcone Pine, *P. attenuata*, likewise of California origin, was markedly burned, but has recovered during the summer.

In the recent plantings of young pines on Foster's Island, a lower site but with generally better soil conditions, only *P. caribaea* and *P. radiata* were lost.

The only other conifer to be seriously affected was the Himalayan Hemlock, *Tsuga dumosa*. Two plants out of three 6 to 7 feet high, placed in the Magnolia area two years ago, were killed and the third has made very weak growth in 1950.

Eucryphia

Planted in the upper part of the Arboretum, most plants protected by maple and other trees from east and south; soil generally light and well drained.

All were damaged except the deciduous *E. glutinosa* (*pinnatifolia*); the Tasmanian *E. lucida* (*Billardieri*) most severely, with all foliage killed and growth very weak during

1950. Of the hybrids, one plant of *E. intermedia* (*lucida* x *glutinosa*) was killed, another shows very little fresh growth. In the case of *E. nymansensis* (*glutinosa* x *cordifolia*) young plants 2 to 3 feet high were killed to the snow line; older and larger specimens lost foliage but have made satisfactory recovery.

Hebe

These shrubby Veronicas from New Zealand grow close to the Eucryphas, on banks by the Upper Road in a light, stony soil. On the whole they came through this trial well, except for damage by snow pressing down and opening the plants.

H. Colensoi, represented by small plants, and *H. Hulkeana*, excepting one very weak survivor, were killed. The former species is from the North Island of New Zealand.

Of the remaining twenty-one species or hybrids the following suffered most, being often killed to snow level: *H. "Autumn Glory"*; *H. albicans*; *H. amplexicaulis*; *H. Matthewsii*; *H. pinguifolia*; *H. rakaiensis*. Some plants of *H. Matthewsii* succumbed.

Little injury was apparent to: *H. Allanii*; *H. Armstrongii*; *H. Buchananii*; *H. buxifolia*, and *H. propinqua* x *H. buxifolia*. These and others have made good growth during the year, some flowering.

Hypericum

Growing close to the Hebe collection in similar soil, but air drainage probably much poorer, being in a shallow basin on the ridge.

No plants killed, but *H. elatum*, *H. hircinum* and all varieties of *H. patulum* cut down to snow or ground level. All recovered rapidly during the summer, flowered (except "Rowallane Hybrid") and in most species produced seeds.

Ilex

The young holly collection is also planted by the Upper Road close to *Eucryphia* and *Hebe*, but on a more or less level site sheltered by trees, especially on south and west.

(Continued on Page Twenty-eight)



Upper: *Rhododendron discolor* in *Fortunei* group.
Lower: *Rhododendron Fargesii*, north of Glen.

—Photos by E. F. Marten



Mt. Airy Arboretum—Mt. Airy Forest Cincinnati, Ohio

HARRY A. GRAY*

THE Board of Park Commissioners of Cincinnati, Ohio, in the year 1911 initiated land purchases for the area now known as Mt. Airy Forest. By the year 1913 approximately 1000 acres had been acquired within the northwest edge of the city limits and in subsequent years expansion was continued until at the present time Mt. Airy Forest comprises 1365 acres. The nucleus of Mt. Airy Forest was farm land, formerly used for unrestricted grazing, which was hilly, cut with moderately steep ravines, lacking vegetable fibre and possessing a tendency to sheet erosion. A reforestation and erosion control program was deemed the only solution for the conversion of this land to park purposes; and as this program progressed the property developed into the first municipal forest in the United States.

The development of Mt. Airy Forest started with the planting of 700 acres of land, and 200 additional acres later, with coniferous and hardwood trees. Of the 900 acres, 200 acres were planted with coniferous trees including White, Red, Jack, Scotch, Austrian and Ponderosa Pines, Douglas Fir, Norway and Blue Spruce, Larch, Hemlock, Eastern Red Cedar and Bald Cypress; the remaining 700 acres with mixed and single plantings of hardwoods consisting of Red, Swamp White, Burr and Black Oaks, White, Biltmore and Green Ash, Tulip Tree, Basswood, Black Walnut, Sugar and Red Maple, and Beech. The rehabilitation of native woodlots was a part of the development program, and large areas have been opened to the public by the construction of roads, trails, picnic areas, open shelters, comfort stations, a concession stand, a waiting station at the main entrance of the forest, and two lodges (these lodges available by permit only, one for a maximum of 50 persons and the other to accommodate up to 300).

*Mr. Harry A. Gray is superintendent of the Board of Park Commissioners of the city of Cincinnati, Ohio, owners and operators of Mt. Airy Arboretum.

In January, 1930, the Horticultural Division of the Board of Park Commissioners prepared a preliminary report and tentative layout plan for an arboretum in Mt. Airy Forest; and subsequently a complete layout plan for the location of 20 arboretum plots in an area of 120 acres was prepared and approved by the board. In the report accompanying this plan it was pointed out that "the purpose of this arboretum shall be to develop nature in a school child, supplement the book study of the botany student of the high schools and of the University of Cincinnati, to afford recreational pastime for the nature lover, and create a general appreciation for the preservation and conservation of trees." The initial planting in this Arboretum in 1932 was made possible by the donation of funds by the Federated Garden Clubs of Cincinnati and vicinity. Other contributions followed for the purchase and planting of various species and varieties, and further development was accomplished with material that was moved from the Park Board nurseries, purchased, or received from other sources.

A noteworthy contribution of approximately \$10,000 for a development in the Arboretum to be known as the "Max and Louise Braam Memorial Section" was received in 1949 from the Ohio Botanic Garden Society. This section will include rhododendron, azaleas, laurel and other members of the ericaceous family, and will be of aesthetic as well as educational interest. The aesthetic effect will be accomplished by the arrangement of the plants in 'drifts' to create a natural appearance; which together with the spectacular beauty of certain plants will be attractive to the general public as well as the student, botanist, horticulturist and amateur gardener.

While at present the Mt. Airy Arboretum does not contain all the plants called for in the plan, all obtainable plants are included, and from time to time other species and va-

(Continued on Page Thirty-one)

Further Notes Concerning the Glenn Dale Azaleas

B. Y. MORRISON*

AMONG the various questions that have arisen in regard to the Glenn Dale azaleas is that concerning the order of their development. This is a question that can be answered best by saying that all were developed with breeding work in three years, and that none represent a combination of the seedlings themselves as none flowered within that three-year period. The only seedling used, and therefore very few crosses, was the best of a series of *Kaempferi x mucronatum* seedlings made personally and taken from my home garden for official use. It was of use only in further work and not for introduction.

The actual propagation of named clones has no time relation to their creation, as all plants had long reached maturity before they were selected.

The next most difficult question has had to do with the possible usefulness of these azaleas outside of the area for which they were bred. No claim has ever been made that they will be good outside of that area, namely, those portions of Maryland, Pennsylvania, Delaware and Virginia that have a climate like that of the District of Columbia. Persons living outside that area have to face the same problem that we faced and still face in assembling parental groups. In our work, the commercial named clones and species that are hardy north of Washington were all of some value, while those that make up the main displays in the South had to be proven. They were purchased from the South and from the results of the expected winter-killing, these remained the possible parents. The survivors were then examined to evaluate their usefulness and only seven were used, *Vittata Fortunei*, *Modele*, *George Franc*, *Milioni*, *Mme. Dominique Vervaeene*, *Fielder's White*, and *Mme. Margotten*. The last has long since succumbed and but one of its progenies has been chosen. The balance are represented in certainly less than 25 of

the clones selected for naming and placement.

The fact that these "Southern Indica azaleas" survived enough for flowering does not mean that they are all "good" garden plants here. Most of them are not and in no way approach the normal luxuriance they show in the South.

Another group of parents of problematical value were the "macrantha" hybrids imported from Japan. These were reported as "macrantha x indica" hybrids, and seem in fact to be "macrantha" x Belgian florist indicas. In our area they are entirely hardy to cold if one plants large specimens or protects liners until they are large. Their "Belgian" ancestors are uniformly tender insofar as tested, but it is entirely possible that, if all Belgian clones were grown, especially some no longer produced for forcing, this might not be entirely true.

The only completely full reports on behavior of Glenn Dale hybrid azaleas that have come in from outside the area are those that the writer has supervised from a location in Gulf Coast Mississippi, and it may be said as a general statement that the more blood there is of one of the very cold-hardy species or clones, the less successful the Glenn Dale clone, even if the other parent grows well in the South. Doubtless in time there may be conspicuous exceptions to this generalization. The problem appeared to be related to lack of winter dormancy, with the shedding of semi-deciduous foliage and the uncertain impulse for new growth.

No complete reports have come in from trial areas where one has to consider a high percentage of hours without sunlight, *i. e.*, regions where there are prevailing fogs or overcast skies. Nor have we any complete reports of value as yet from regions where there is the combination of dry summers and heavy winter rainfall. There is good reason to believe that at least some of the clones will do well in such places. The problem appears to be related to lack of summer heat and uncertain

*This further history of the Glenn Dale Azaleas by their distinguished originator, Mr. B. Y. Morrison, with comments on the most recent varieties, is a most welcome addition to our knowledge of these promising shrubs.

development of flower buds at the normal season.

In this, as in any other breeding program, the first few years of work are primarily exploratory, no matter how carefully one may have studied his field and, since the project was stopped by reorganization, there is no reason to doubt that the excellent plants obtained in the first crosses can not be bettered in future work, largely in refinements that appear as one progresses. Nevertheless, the main objects were accomplished, namely, a widening of the blooming season early and late, a filling in of the gap between the April and June groups, a diversification of color and pattern in all groups, and a production of a wide range of large-flowered clones cold hardy in this climate. As a bonus, there were produced among all these plants in which the bush habit allows a probable maximum of 15 feet in some clones and of two feet in others, as well as plants with such fine evergreen foliage that they might be grown for that purpose even if they never flowered.

It is readily admitted that the total number of clones appears formidable, but, if one considers that, practically speaking, the evergreen and semi-evergreen azalea has been revolutionized for this area and transformed from a desirable spring-flowering shrub into the most important shrub for our spring and early summer, one need not be too grudging in his estimates.

The writer fully advocates the program that the same sort of work should be done by other workers for other regions, and already has under way a personal breeding program for another area in which he has had to abandon many clones, his own as well as those of others.

To the amateur the chief value of the collection that is being sent to the Arboretum in Seattle is that it should eventually show which, if any, of the Glenn Dale azaleas grow with zest and vigor and flower in proper abundance in the climate of Northwestern Washington. As each group has reached the stage of mass propagation plants are sent, and no change is anticipated, so that eventually the entire collection will be represented.

Since every conceivable type of parental combination was made within the limits of the materials assembled, it should be clear that the "Glenn Dale azaleas" are not all alike, nor do they have the appearance of a single race in any way save that all are obviously derived from members of the *Obtusum* sub-series. No embarrassment is felt in this regard since it already has precedent in the horticultural races of azaleas, the most striking example being the "Belgian" or "florist's indicas." These are of mongrel hybrid origin and if one has a large collection of clones he will observe a far greater range of habit and foliage characters than he might suspect if he knows only the *Vervaeana*, Petrick, Prof. Wolthers and the *Schaume* groups.

There is scarcely any value for a discussion of named clones at this time when none of us knows their value under your conditions, but it may be well to name a few of the outstanding types grouped by season, color of bloom, and by bush habit.

Because there has always been a dearth of good white azaleas, particular attention was given to this phase of the work. In an earlier article various whites were mentioned. The following five varieties, all not yet placed in trade, make an outstanding addition to those already described. These are all May-flowering here, with large flowers and enough variation in their flowering season to cover the month. All are relatively more broad than tall in habit and all approach the Belgian type in style and habit, once the bush has made its skeleton growth and settles down to the formation of short flowering twigs. They are: "Arctic", "Damask", "Helen Close", "Angela Place" and "Silver Lace."

"Treasure" has already been mentioned as a tinted white. Its sister seedling, "Sheila", is almost like it but one degree more deeply flushed with pale pink, which it holds when the flower is mature.

For pure pinks with large flowers, I should propose "Dream", "Simplicity" and repeat "Joya". These could be followed by a series somewhat deeper in tone to rose with a touch

(Continued on Page Thirty-six)

Insect Pests of Rhododendrons

E. P. BREAKEY*

RHODODENDRONS are relatively free from insect attack in western Washington. This may be due in part to the fact that the area is a natural environment for these plants. It is probably also due in part to the fact that several of the well-known insect enemies of rhododendrons are not yet present in the region. All persons interested in the culture of these plants are urged to guard against the introduction of insect pests when bringing planting stock into the region from other sections of the country, or from abroad.

PART I.

PRINCIPAL INSECT PESTS OF THE FIELD AND GARDEN

RHODODENDRON LACE BUG

(*Stephanitis rhododendri* How.)

The Rhododendron Lace Bug is a sucking insect that may be found feeding on the under sides of the leaves of rhododendrons and mountain laurel. It belongs to the family *Tingidae*, whose members are called lace bugs because of their gauze-like reticulated wings, the peculiar hood-like structure over the head and the broad lateral expansions of the prothorax, suggestive of an exaggerated Elizabethan collar. The nymphs are relatively small and spiny. It is a native of the eastern United States and was introduced from there into Europe and the Pacific Northwest.

The insect passes the winter in the egg stage. The eggs are inserted in the lower surfaces of the leaves along the mid ribs and larger veins in late summer and early fall. Nymphs hatch from these eggs the following May and June and become fully grown by late June or early July. A second generation of adults appears in late summer or early fall.

Injury is caused by the nymphs and adults feeding on the under sides of the leaves. The insects remove or destroy the chlorophyll causing the leaves to take on a mottled, gray-

ish discoloration. Later, these leaves may turn brown and leathery and cease to grow. The lower surfaces of infested leaves are usually disfigured with numerous small, dark, varnish-like spots of excrement and sometimes with the cast nymphal skins.

Control

Lace bugs are readily controlled by the timely application of a good contact insecticide. One ounce (2 tablespoonsful) of nicotine sulphate 40 per cent, or of 50 per cent free nicotine (nicotine alkaloid) to six gallons of water plus three or four ounces of soap makes an effective spray. Prepared sprays containing the extract from pyrethrum flowers or that from cube or derris roots are also effective and should be applied according to the manufacturer's directions. Sprays containing DDT should be used with caution since rhododendrons are easily injured by this insecticide.

The application of the spray should be timed to kill the nymphs before they have developed into adults and have laid any eggs, i.e., June 1 to June 15. It is usually advisable to make a second application about a week or ten days after the first, particularly where the foliage is dense. Spray thoroughly and direct the spray upward against the lower surfaces of the leaves.

RHODODENDRON WHITE FLY

(*Dialeurodes chittendeni* Laing.)

The Rhododendron White Fly is another insect found on the under sides of the leaves of rhododendrons. These small moth-like insects are related to the scale insects and, like them, feed by sucking the juices from their host plants. Also, like the scale insects, the immature stages are sedentary, with the exception of the newly hatched larvae which move about until they begin feeding. The adults of both sexes are winged, however, whereas only the male scale insect develops wings and is able to move about in adult life. These insects are quite small. It would take

*We are delighted to offer our readers this splendid article on Rhododendron pests and their control from the pen of Dr. E. P. Breakey, Associate Entomologist, Washington Agricultural Experiment Station, Puyallup, Washington.

about ten adults with wings outspread placed tip to tip to measure one inch.

The insect was described as a new species in England in 1928. It is thought that it came to England on plants from the Himalayan regions. In 1933, the insect was found in Seattle on rhododendrons that had been imported from England. This chance discovery prompted a survey of the Puget Sound country and disclosed well-established infestations in Seattle and Tacoma, Washington, in the Fraser River Valley east of Vancouver, British Columbia, and on Vancouver Island near Victoria.

Both the larvae and pupae of the Rhododendron White Fly are found on the under side of the terminal leaves. When present in numbers, their feeding causes a yellowing and mottling of the leaves, and in some varieties, this is accompanied by a curling of the leaf margins. The rate of development of the population is so slow that feeding is not deleterious to leaf growth or appearance until spring. The development of the third stage larvae is rapid, however, and the consumption of plant juices is sufficient to produce the mottled appearance. Considerable loss in the ornamental value of the plant also results from the growth of sooty mold fungus on the lower leaves which catch the honey dew dropped by the white fly larvae above them. A plant infested with white flies rapidly loses its ornamental value since rhododendrons normally retain their leaves for approximately three years.

There is but one generation each year of the Rhododendron White Fly in the Pacific Northwest. The rather large eggs are laid on the under sides of new leaves during the months of May, June and July. Development during the winter months is very slow and second- and third-stage larvae are present in about equal numbers. A few pupae may be found as early as November, but the peak development of this stage occurs in April and May.

Control

The timely application of an oil spray, prepared to contain 2 per cent of a summer oil

emulsion, is very effective in destroying the larvae and pupae of the white fly, and is not injurious to the host plants. Adult white flies are quite susceptible to nicotine and the population can be effectively reduced during the time they are flying by the application of nicotine dusts and sprays. Nicotine dusts and sprays are not effective against the larvae and pupae, however. Oil sprays for the control of the white fly larvae and pupae can be applied at almost any time of the year, but early in the fall is probably the best period. The terminal leaves are still erect, making effective spraying easier, and the white fly larvae have not developed to a point where their feeding has done serious injury.

Sprays containing the new insecticides such as lindane, parathion, chlordane or tetraethyl pyrophosphate should be prepared and used according to the manufacturer's directions.

ROOT WEEVILS

The root weevils are probably the most important insect pests attacking rhododendrons, azaleas, camellias and blueberries in Washington. They destroy many valuable plants and occasionally entire plantings each season.

Species or Kinds of Root Weevils

The weevils found attacking these plants usually belong to one of three species. They are known as the strawberry root weevil *Brachyrhinus ovatus* (L.); the rough strawberry weevil *B. rughostriatus* (Goeze); and the black vine weevil *B. sulcatus* (Fab.). The adults and larval forms of these weevils are similar in appearance except for size. The beetles have snouts or beaks, none of them are able to fly and all are females.

The adult strawberry root weevil is about one-fifth inch long and varies from black to brown in color. The rough strawberry root weevil is about one-fourth inch in length. It is usually an even dark brown in color. The black vine weevil is about two-fifths of an inch in length, black in color and often marked with small flecks of yellow or white.

There are several other kinds of root weevils which are sometimes injurious. Ordinarily they are not numerous and can be

controlled in the same manner as the strawberry root weevil.

Life Histories

The life histories of all root weevils are somewhat similar. Most of them pass the winter as white to pinkish-colored legless grubs in the soil around the roots of the host plants. In the milder sections of the state, however, some adult weevils overwinter around the bases of the plants. The weevils which overwinter as adults usually appear and begin feeding on the plant foliage the latter part of March or the first part of April.

BLACK VINE WEEVIL

(*Brachyrhinus sulcatus* Fab.)

The Black Vine Weevil is probably the most important of the root weevils known to attack rhododendrons. The first record of injury to cultivated plants by the larvae and adults of the Black Vine Weevil was made in Germany in 1834. Since then, records of injury to economic plants have been appearing with increasing frequency in Europe, England, Ireland, the United States, Canada and Australia.

The Black Vine Weevil is typical of the group. Newly emerged adults are glistening black in color and if several were laid end to end, it would take about two and one-half beetles to measure one inch in length. The hard wing covers or elytra are marked with longitudinal furrows or striae. Most of the damage is done by the larvae.

Black Vine Weevils may pass the winter either as hibernating adults or as nearly mature larvae in the soil. Apparently, most of them overwinter as larvae in the soil. The larvae complete their development and pupate late in May and in June. The majority of the adults appear early in July, though certain retarded individuals may appear much later. A considerable number are known to emerge in September. These doubtless hibernate. After feeding from three to six weeks, the beetles begin to lay eggs. These are dropped aimlessly on the ground under the host plants. There is but one generation each year.

Injury

Plants infested with root weevils may be

girdled and killed outright or take on a stunted appearance. The small grubs feed entirely on the rootlets. As the grubs grow they also feed on the larger roots and even on the crowns or stems of heavily infested plants. The adult weevils feed on the leaves, bark and fruits, but the total damage done by the adults is not considered serious as compared to that of the larvae or grubs.

The rounded notches that one often finds cut in the margins of rhododendron leaves have doubtless been made by Black Vine Weevils while feeding. The adult beetles do their feeding at night or on heavily overcast days. Of more importance, though less evident, is the girdling of new growth late in the season. A narrow ring of bark is eaten away near the base of the twig. These twigs die during the following winter and are often mistakenly said to be "winter killed." It is known that the older larvae will completely girdle the trunks, killing plants as old as three years or older. The foliage of girdled blueberry plants will often turn red prematurely.

Control

Poison bait has been the standard recommendation for the control of root weevils. Most growers use commercial preparations of weevil bait. These baits should contain dried apples or other fruits and sodium fluosilicate. Spraying the foliage with a stomach poison such as lead arsenate is not effective since the beetles are not heavy feeders and will not get sufficient poison to kill them.

Time and Number of Applications

Watch the plantings for evidence of root weevils, beginning about the first of April and on throughout the season. The first application of the bait should be made when or soon after the first adult weevils are found. Most of the adult weevils emerge from the ground during the latter part of May and the month of June. This period may vary slightly from year to year and with localities, but usually coincides with the development of the red coloring incident to the ripening of the Marshall strawberry. The strawberry root weevil is the first to appear and is followed in

(Continued on Page Thirty-two)

About Rhododendron Varieties

J. HAROLD CLARKE*

IT IS NOT UNUSUAL that complications should arise in the nomenclature of rhododendrons as the genus includes several hundred species and horticultural varieties in the thousands. Perhaps what I have to say as a recent student of this genus will help beginners who may be puzzled by the somewhat complex variety situation.

First let us consider just what a variety is, as a clear understanding by all rhododendron fanciers is highly desirable. Botanists use the term "variety" to designate certain groups within a species which differ slightly from the species type and which maintain that difference in succeeding generations. These botanical variety names are Latinized.

Horticulturists use the term somewhat differently, the variety names being in English. As a matter of fact, the variety is the basis of nearly all horticultural activity. We plant, grow and market "Delicious" or "Winesap" and not just "apples." The gardener does not simply buy a rose, but he buys "Peace" or some other named variety. In American horticultural writings, varieties are usually considered to be of two types: (1) A group of plants grown from seed which come reasonably true to type with all individuals essentially alike, such as most vegetable varieties and many of the annual flowers. (2) A group of plants propagated asexually from one original plant. The latter is a clonal variety, and the various fruit trees, grapes, small fruits, as well as roses, lilacs and other shrubs, are usually propagated as clones. Among woody plants it is the custom in America to name only clones except when the plants are sold as species, as is the case with most of the shade trees and a few of the shrubs which are normally propagated by seed.

As a general rule, American breeders have listed progenies resulting from a cross between

two species, or varieties, simply as "Variety A x Variety B." A notable exception is in the case of orchids where Latin names are given to certain groups of plants resulting from a cross between two known species or types. In the case of lilies, there has been a tendency recently to give varietal names to groups of seedlings as well as to clones because of the prevalence of virus diseases which has made it desirable to propagate certain types by seed, even though there is some variation in the offspring.

The English System of Naming

The English rhododendron breeders have not followed our horticultural method of using variety names for woody plants for clones only, although some clonal varieties have been named. They have also given names to groups of seedlings in about the same way the orchid breeders have named their groups. For instance, "Fabia" is a name which includes all of the seedlings of the cross *R. dichroanthum* x *R. Griersonianum*. Under this system anyone who makes this cross at any time should call the resulting seedlings "Fabia." However, superior "Fabia" seedlings have been selected by certain growers and given additional names, such as "Fabia" var. "Tangerine."

There are fairly obvious reasons why this system has been followed. It was started by botanists who gave Latin names to certain inter-specific hybrids, such as *kewense*, a name given in 1888 by Kew Gardens to the offspring of *R. Griffithianum* x *R. Fortunei*. English breeders have been, primarily, amateurs working for their own pleasure and for the production of more beautiful garden forms, with little thought of commercial distribution of these forms by nurseries. As the system has developed, the more experienced breeders have understood the variety situation and probably felt that younger breeders and fanciers should master the present varietal complex. This system saves the trouble of careful selection and the discarding of many

*Dr. J. Harold Clarke, who, it will be remembered, talked to the members of the Arboretum Foundation on the occasion of their annual membership meeting in September, 1949, is manager of the Cranguyma Farms, Long Beach, Washington.

good seedlings in order to save only the best. The nursery trade in England is aware of the problem but it is easy to raise thousands of plants of a variety in this way. During the Rhododendron Conference in England in 1949 I talked to many amateurs and research horticulturists, and they were almost without exception opposed to that system.

Because so many of our better varieties have come from England, American fanciers, breeders and nurserymen have been inclined to follow suit, even though American gardeners have been accustomed to horticultural varieties of woody plants being propagated only as clones. Probably many others have had my experience of finding that some of the varieties purchased were seedlings rather than clones. In my case, the nurseryman who sold some of the plants to us apparently did not know that the varieties were not all clones.

This situation is the more confusing because catalogs in this country, and most of the English catalogs, do not mark the varieties so that one type may be distinguished from the other. Bowers¹ does give some space to this problem, stating that "the broad term 'variety' or 'horticultural variety' or 'named variety' has covered them all, so that only the initiated know whether they are clones or not." His book is out of print, however, and does not give separate listing to clones and group varieties.

Action of the American Rhododendron Society

Members of the American Rhododendron Society became concerned because in some cases inferior seedlings were being sold under variety names; thus two neighbors might buy the same variety but have plants which were quite different not only in appearance but in hardiness. Some plants of this mixed seedling type have come from nurseries in this country and some from England. In fact, certain English nurseries have been known to buy up for resale what was left of the seedlings after the breeder had taken out those plants which he considered the most valuable for propagation. The American Rhododendron Society, there-

fore, made a specific project of this matter of nomenclature and as a result the following statement was prepared, and the suggestion made that it be included in Rhododendron catalogs:

How Rhododendrons Are Named

Two types of horticultural varieties of rhododendrons are in the nursery trade. The first type includes those varieties which have been propagated asexually by cuttings, layers, or grafts from one original selected seedling. Such varieties are called clones or clonal varieties and all plants of such a variety have identical characters except as they are influenced by environment. The second type of variety consists of a group of seedlings of a particular cross, usually between two species, or between a species and a variety. Such "group" varieties exhibit more or less variation, so that two plants of such a variety may be quite different. As recommended in the Preliminary Code of Nomenclature published by the American Rhododendron Society, we are marking all "group" varieties by the abbreviation "gr." All varieties not so marked are clones. All special award varieties, marked A.M., F.C.C., etc., are clones which have been propagated asexually from the original plant receiving the award.

Those who have access to the Rhododendron Hand Book of the Royal Horticultural Society may feel that the Rhododendron Stud Book, which it includes, gives sufficient information to clarify this situation. The Hand Book, however, does not explain the English system of naming. While the first hybrids listed in the Stud Book were given Latinized names, more recently the practice is to use common or fancy names. Furthermore, instead of giving these fancy names to groups which are only F_1 hybrids, such group names are now given in many cases to F_2 hybrids. For instance, "Felicity" is "Radiance" x "F. C. Puddle." Both of these parents are hybrids, and one of the parents of "Radiance" is a hybrid, and one of the parents of this hybrid is, in turn, a hybrid. Such complex hybrids must involve a great deal of variation

(Continued on Page Thirty-four)

1. Bowers, Clement Gray. Rhododendrons and Azaleas. Macmillan, 1936.

Winter Takes Its Toll

HERBERT G. IHRIG*

THE past winter gave us the lowest temperatures in over fifty years and it therefore becomes necessary to revalue the hardiness of some of our rhododendrons. Losses varied from the destruction of flower buds to complete loss of plants.

In dealing with these losses it should be definitely understood that the reaction of plants differed in various gardens and even in different locations in the same garden. Any commentary must therefore be in general terms and may or may not apply to specific locations.

The surprising thing to most gardeners was not the actual losses, which were few, but the great number of fine varieties which weathered the severe conditions and came through unharmed. Some nurserymen, especially those situated on low ground, may disagree with this statement, but I feel certain the garden damage was much less than that of the nursery trade.

Damage can be placed in four general classifications: (a) loss of flower buds, (b) branch damage, (c) defoliation, and (d) loss of the entire plant. I might add that from my own observation some plants had smaller flowers than usual, especially in more exposed positions. Whether this was due to the extreme cold or the lateness (slowness) of spring I do not know and it would be interesting to learn whether this condition was observed by others.

In going over my winter notes it is difficult to know where to start. My first notation was the defoliation of a number of Japanese evergreen azaleas, imported before the war. Most of these have recovered, but a few were lost apparently from bark splitting. The second was the sad condition of *R. Griersonianum* and many of its hybrids, of which I have quite a number. At first I was inclined to "write off" all such crosses, for the damage

extended from the smaller one-foot plants to large six-foot "Sarita Loder" plants. Even "Fabia" had some flower bud and branch injury. This would have been a grave error, for many varieties such as "Mrs. Donald Graham," "Lille Dache" and "Azor," came through and flowered splendidly. Also several new "May Day" never turned a leaf and flowered beautifully.

Next in the semi-hardy group *fragrantissimum* was completely defoliated and most branches killed. Some were lost completely, others are budding out from the main stock. "Cornubia," which suffered badly in several nurseries, lost most of its flower buds but I still had eight blooms although they were rather anemic. In the *Maddenii* Series *R. crassum*, one of my favorites, lost its top branches back to about three feet. An occasional *R. ciliatum* lost a branch or two, *R. Johnstoneanum* was cut to the ground in two spots and unhurt in a third. Both the damaged ones are coming up from the root. *R. calophyllum* (not to be confused with *R. calophyllum* in the Fortunei series), two plants completely defoliated but are sending out new shoots; a third in the same group was only partly defoliated.

R. arboreum, which I have grown for twenty years, was thoroughly disappointing. This species has several times attained considerable height only to be cut back by severe weather. One ten-foot plant is now back in the two-foot class. Most of these I have consigned to a brush fire but, strangely, one in a dry location lost only a few top leaves.

One could go on at length with minor individual damage to different plants but it might be more fitting to turn the page and look at those which came through with flying colors. For instance, plants of *Loderi*, of which I have about ten selected varieties such as "King George," "Venus," "Sir Edmund," "Superlative," "White Diamond," etc., came through without the slightest damage. In fact,

(Continued on Page Twenty-five)

*Long an ardent grower and authority on rhododendrons, our former editor of the Arboretum Bulletin, Mr. Herbert Ihrig, needs no introduction to our readers.

Further Comments on Rhododendron Hybridizing

LESTER E. BRANDT*

AS EVERYONE in the Northwest knows, the past winter was very hard on the majority of rhododendrons, especially the more tender species and hybrids.

In a few favored spots that were sheltered from the terrific wind, the damage was much less, although even yet most plants are dropping old leaves that normally are retained for two or three years.

The *Maddenii* series species were mostly killed or cut to the ground, and the large-leaved varieties suffered severely, especially *Falconeri*, which was hurt in some places even more than *sino-grande*.

Many of my new hybrids, three and four years old, on a north slope where the snow had blown away, suffered badly from bark splitting, and I was afraid the loss would be heavy, but most of them healed up, grew during the summer and are now in good shape, considering what they went through.

I mentioned in an article in the BULLETIN, several years ago, a number of crosses that showed some promise at an early age. This promise in many instances has been fulfilled, although it will take several more years to shape up the plants so that some idea can be had of their ultimate size, habit and blooming qualities.

Several crosses of *Azalea occidentalis* with evergreen rhododendrons have given flowers unlike anything we have had so far; some like trusses of huge hose-in-hose primulas in peach, cream and gold colors; others with very large reversed calyces, in bright red and bronze, and all fragrant, with a faint to strong scent. The leaves are ordinarily evergreen, with brilliant fall coloring and the bushes show promise of being rather compact, of good habit.

The old theory that crossing hybrids would not give good results has been thoroughly disproved, as some of the most beautiful rhodo-

dendrons that we have now, and a number of new ones becoming available in England, are the result of hybrid crossing, of course with care in the selection of the parents and with a definite object in view.

Mr. F. C. Puddle, in the Rhododendron Year Book of the R. H. S. for 1948, goes thoroughly into this subject, giving some of his theories and the results of the last forty years of hybridizing. As Bodnant garden is famed for its brilliant new rhododendron hybrids, and Mr. Puddle had a large part in developing them, it is apparent that he knows what he is talking about. Since very few of the Bodnant hybrids are available in commerce, especially the *R. repens* crosses, I have been trying to duplicate them, or make some that are similar.

It takes a good many years to get a rhododendron into bloom from seed, and several years after that before one can tell whether the plant is worth while or not, and therefore is rather a slow process. I have been fortunate in being able to have *repens* itself in bloom several times, as well as some of the few *repens* hybrids that are available, and results will now be known in a fairly short time; in fact, a few plants will bloom this coming spring, 1951.

I have also been doing a little hybridizing with some of the rather tender *Maddenii* and *Edgeworthii* species, as the flowers are outstandingly beautiful and many are fragrant, but the last few winters have been so hard that it is doubtful if it is any use doing any more with them, as they could only be used as a greenhouse plant or outdoors in very mild districts, unless the weather changes.

In England there has been some hybridizing with *Loderi* and other large growing plants, but it seems to me that the ultimate has been reached in size and dignity in that type, so it is doubtful if any more could be done to improve them, although a few wonderful hybrids have been made from *Loderi*.

*Mr. Lester Brandt, nurseryman and specialist in rhododendrons, contributes another of his interesting discussions on hybridization. (See: Arboretum Bulletin, Spring 1948, "A Condensed Outline of Rhododendron Hybridization.")

There are still no true yellow or blue elepidote rhododendron hybrids, although some work is being done with them. All of the yellows so far are various shades of cream, and the blues are lavender or purple.

There is still a wide field for work among the dwarfed Lepidote rhododendrons; Mr. Puddle, in the article referred to, mentions a number of possibilities.

The various dwarf members of the *saluenense* series, such as *calostrotum*, *radicans* and *keleticum*, would have possibilities as parents of a dwarf and hardy race of hybrids. One drawback, however, is the rather virulent magenta color of most of them, which would probably take several generations of careful crossing to change.

Another possibility, that at first thought would seem easy, is *chryseum* or *flavidum* crossed with *Keiskei* or *lutescens*, to make a dwarf yellow type, on the order of "Blue Tit" or "Blue Diamond." One difficulty is that neither *chryseum* nor *flavidum* is easy to get, and another is that they are both averse to taking pollen of any other rhododendron. I have tried each a number of times with no success so far, but hope that some time the conditions will be right and seed will form.

Captain Kingdon Ward, on one of his plant hunting trips, found plants of a cross between a yellow and a purple dwarf rhododendron. He mentions that the flowers varied in different plants, from purple, apricot, salmon-pink, crushed strawberry and many other shades. He gives the seed number, but I have never seen it listed, or any forms of it mentioned as being in cultivation.

It would probably be worth-while to try crosses of different shades of Lapponicums, and it would not be too long a process, since they bloom in two or three years. About all the colors that are available at present in the dwarf hardy types are various lavenders, mauves, and purples, so the pastel shades all blending together would create beautiful effects in edgings or large rockeries.

Other dwarfs that have been suggested for hybridizing are the *Cephalanthum* species such as *ledoides*, *radinum*, etc. Most of them are

pale pink or white, although one or two have pale to deeper yellow flowers.

They are all very charming plants in themselves, and I doubt that there would be much advantage in trying to improve them, although something worth-while in deeper pink, or clear yellow, with a tiny but perfect truss, might be evolved.

I have often wondered why some of the famous gardeners have never tried crossing *R. pemakoense*. It is very dwarf, has comparatively large flowers, is very easy to propagate, is hardy and will bloom from cuttings when only one year old. In short, it is almost perfect and that may be the reason no one has tried doing anything with it. However, the flowers could be made a deeper and truer pink, or, in a couple of generations, perhaps even a clear yellow, in a plant not more than a foot or two high, and including all its other virtues.

There are a large number of medium growing plants in the *Triflorum* series, but there are a great many with only minor botanical differences, so about the easiest and best way to handle them would be to grow a large quantity from seed and then select and propagate the best forms. This series, as well as all the others, is in a process of revision by Dr. Cowan of Edinburgh, so in a few years we will probably find that many species will be eliminated altogether, or merged with others.

To take a step upward, from the extreme dwarfs to the medium bushy growing plants, we will find that we are getting away from the lepidote and into the elepidote, broader leaved rhododendrons. One that has been used a good deal is *R. Williamsianum*; in fact, there are at least twenty-two primary crosses made with it, as well as several of the second generation. All that I have seen are very beautiful, with flowers ranging from creamy yellow to almost a true red, and they seem to be good bloomers when they reach a certain size, better than *Williamsianum* itself.

The *Neriiflorum* series has been used extensively for primary crossing; probably most

(Continued on Page Thirty-one)

Propagation of Rhododendrons

ENDRE OSTBO*

JUST before he left for England last summer Mr. Mulligan asked me to write an article for the BULLETIN about the propagation of rhododendrons as we have done it at this nursery for the last few years. This I promised to do if I could refer to what other nurseries have done and to books with pictures on the subject that will give the beginner a clearer idea of details than can be put down here.

I assume that Mr. Mulligan meant to give advice to the amateur. The commercial growers have proven ways that are best suited to the locality and the plants they produce in quantity. Anyway, what I note down here is for the amateur in this part of the country. I don't mention the raising of rhododendrons from seed. It would take a book for that, and there are books to be had on the subject. And it takes years and ample growing space to know what the plants are worth. The finest garden rhododendrons today have been raised from seed during the last 75 years and selection of the best is still going on. So I think the amateur is lucky to get the benefit of all the work and study that has been done, as selected, named plants can be had right here in the Northwest, so only ways to propagate them will be mentioned.

The named varieties of rhododendrons have to be propagated from wood of the original plant. By grafting, cuttings, layering, budding and scion budding for most of the broadleaved evergreen kinds and our finest garden varieties.

The Cunningham (pink and white forms), "Rosa Mundi," and some fine varieties of *R. ponticum* can be divided easily if wanted in quantity, to hold the soil on banks and steep woodland patches. *Rhododendron pema-koense* and many of the *Azalea* group like *viscosa* and *occidentalis* send out runners that

can easily be cut off and planted in rows to grow on.

Layering is the simplest way for the amateur to increase plants. It requires no skill or experience, no equipment or expense of any kind, and shows no losses or failures. Methods of layering can be many, but the simplest is to take a low branch, lay it flat on the ground and cover with peat moss. Bend up the tips and tie them to stakes. To bend up the tip is important because that checks the sap flow, and makes them root there. To cut the bark underneath is not necessary, but lay a few rocks or bricks on top to hold them down and keep them moist.

I have seen them rooted just by falling leaves lying on them. Even rooting in an old robin's nest filled up with leaves in a moist place, where sun and wind doesn't dry it out.

Is that all there is to it? Yes, if you have the right plant for the place they are to be used for. Layering has been done commercially in England for years and they are still doing it.

The nurseries here don't do much of it because it makes uneven rows, and the use of the rototiller difficult, so that much hand weeding has to be done. Rooting from cuttings has been done and is o.k. for the scaly-leaved kinds like *Augustini*, *fragrantissimum* and the *cinnabarinum* hybrids. The broadleaved garden hybrids will also root, but do not make as vigorous plants on their own roots.

Grafting Rhododendrons. The first step is to sow seed of *R. ponticum* or a *ponticum* hybrid in some cases. Take seed as soon as ripe in December, dry it a couple of weeks, sow in peaty soil or pure Canadian peat moss. Sow in low flats, and set in a fairly warm greenhouse. Prick out in flats before July 1, keep in a greenhouse the next winter and plant out in May in rows. Keep them growing vigorously to get thick bark and soft wood about pencil thickness or a little less, pot up in September in 3- or 4-inch pots, keep

*Numbers of us have turned to Mr. Endre Ostbo, owner of the King of Shrubs Nursery, Bellevue, Washington, for just such information as this article gives us and which we are pleased to print for the benefit of all.

in frost-free greenhouse until January 1, then give more heat and they will be ready for grafting in two to three weeks. The old Dutch methods which have produced 80-90 per cent of the world's rhododendrons during the last 75 years are still the most common in the big nurseries.

The potted plants are veneer grafted, that is, a cut is made in the stock to a flat surface, the scion is cut on one side to fit it so that the cambium layer meets all the way, then tied with waxed string and laid on its side in a warm propagating frame (70 degrees) in moist, not wet, peat moss. Cover the pot and scion with moss up to the leaves, and lay the sash over. Keep airtight for 10 days. If too much water stays on the glass take sash off, let the water run off, and lay back again. Every ten days give a little air, for a few minutes at first. Later up to half hour, giving more after four weeks. After six weeks they should be set up and some of the stock cut back. Give more air later, and in May plant out in frames or rows in sheltered places. For more detail on this with pictures see Bailey's "Cyclopedia of Horticulture." This is the method most used in this nursery. Here we don't use pots because we grow grafting stock in peaty soil, and the roots cling to the soil in handling. We also use rubber strips instead of waxed string. If the stock or scions are small like "Bow Bells," "May Day" or others of this type we prefer the side graft instead of veneer graft.

The saddle graft has been used in England commercially and by amateurs here, with good results. Potted plants are used and the stock cut to a wedge as close down as you can. Scions are split from the end up and tied with rubber strips. Set the plants up straight in the propagating frame with sash over but do not cover the graft with moss. No foliage is left on the stock. We have not done much of this here.

Not far from this method is the rootgraft. Here no potted stock is used. Split the scions as for the saddle graft, cutting roots of *R. ponticum* to fit the cut in the scion. Tie with raffia and put in a warm frame. This prob-

ably is the riskiest of the grafting methods and not all varieties are suited for it. They make nice plants and are free from suckers; for more detail on this see an article by Mr. Hanger in the Royal Horticultural Society's Rhododendron Yearbook, 1949. We have done a good deal of rootgrafting at the nursery. It is easy to get good roots in the peat soil and they don't take much room in the warm frame. Budding and scion grafting is done mostly to get seedling plants to bloom sooner and to recover imported plants. We have made a good deal of use of it just to get scions. It is not used on plants for sale, and I don't recommend it for the amateur. Anyone can get plants started and rooted in one way or other but here is some advice:

Poor stuff multiplies and grows faster than fine things, so be careful not to spend a lot of time and space on inferior plants.

First see a garden that has had success with rhododendrons and has a collection of really good ones. See for yourself what is best suited for the site you want to plant and select plants for that purpose. Next get some plants from a nursery which has good plants. They are good for a hundred years, can be moved at any age, and will double their value many times in a few years. There is plenty of proof of this in the Northwest. There is no plant from the nasturtium to the finest orchid hybrids that gives more value and has less upkeep expense than a good rhododendron. I have grown them and most of the plants in between, so I just say what I think, not always what people want me to.

In the National Horticultural Magazine for October, 1950, Mr. Mulligan has an article on the Pacific Dogwood (*Cornus Nuttallii*) with three excellent photos of *Cornus Nuttallii* in the Arboretum taken in May, 1950.

In this issue also, Mr. Clement G. Bowers, editor, has an article entitled "Rhododendron Notes" which is illustrated by two fine photos of *Rhododendron albiflorum*, on Grouse Mountain, Vancouver, and on the north slope of Mt. Angeles, Olympic Mountains, both taken by Mr. Mulligan.

Rhododendron Occidentale

E. J. KRAUS*

AS TIME advances an appreciation of the value of azaleas and rhododendrons as garden subjects under North Pacific Coast conditions is increasing. Three species are found commonly in the wild in the Pacific Northwest. The large pink-flowered *macrophyllum* (*californicum*) occurs along the coast and at mid-height elevations in the Cascade Mountains. The white-flowered *albiflorum* occurs at still higher elevations. In the lower foothills of southwestern Oregon and northwestern California *occidentale* is found in great abundance covering acres and acres of area, sometimes in nearly pure stands.

From my own observations and conversation with acquaintances, *macrophyllum* is not a strictly hardy ornamental far inland from the coast, nor does *albiflorum* succeed well at lower elevations having a hot dry summer. On the contrary, *occidentale* may be readily transplanted. Throughout the Willamette Valley it is a beautiful and most satisfactory landscape subject. During the winter of 1949-50 the temperature dropped one night to 11 degrees below zero F. at Corvallis, Oregon. Practically every flower bud, and many of the leaf buds and branches as well, were killed on plants of *macrophyllum* growing in this vicinity, but I observed no cases of injury among hundreds of bushes of *occidentale*, except for two plants which are said to be hybrids of *macrophyllum* and *occidentale*—on these all flower buds were destroyed but the branches showed no injury.

Under cultivation in the Willamette Valley *occidentale* seems to succeed equally well on the flat clay bottom lands which may be excessively wet during most of the winter months, or at higher, well-drained elevations, even those having the native rock not more than 3½ feet below the surface. The average annual growth of the new branches is from four inches to one foot in length so that in

a comparatively few years, shapely, compact shrubs from 6 to 15 feet in height are formed. The tip of each annual growth usually has a cluster of 10 to 20 creamy white to distinctly pink flowers. These have a delightful pungent scent noticeable for many feet from the plant. As noted there is considerable variation in color and to a lesser extent in size of the flowers. Some plants have the flowers creamy white except for a lemon-colored patch in the upper petal. Others have the back of the petals ranging from a tinge of pink to full rose color. These colors may often extend to the face of the petals as well.

As previously noted, spontaneous hybrids of *macrophyllum* and *occidentale* are said to occur where their ranges overlap. An acquaintance has such a plant, its foliage and bush habit closely resemble *occidentale* and it is also completely deciduous, the leaves assuming a rich, red-brown in autumn before falling. Its flowers are a striking deep pink, considerably larger than those of *occidentale*, the petal segments are wider and the lemon signal patch larger and deeper in color. Altogether it is a magnificent plant, like a splendid, vigorous "Irene Koster," one of whose parents is listed as *occidentale*. I also have a hybrid plant. Its foliage is intermediate between the two parents and the bush form is more nearly that of *macrophyllum*. The leaves are somewhat leathery and most of them remain on the plant during the winter. I have not yet seen its bloom since all the flower buds were completely killed during the past winter, but it has made excellent growth this summer and now (July) has many flower buds forming.

It is reported that *occidentale* has been used in hybridizing experiments. Certainly it is well worthy of parenthood, at least for the Pacific region. I have been informed by one who has had much experience with azalea hybrids that neither the species nor its hybrid offspring are well adapted to the sec-

(Continued on Page Thirty-two)

*Dr. E. J. Kraus of the School of Agriculture Experiment Station, Oregon State College, Corvallis, Oregon, relates his experiences with our fine Pacific Northwest species of the rhododendron.

Winter Came and Went

JOHN W. SCHAEFER*

WHEN one is called upon to write an article upon any subject one is confronted with many problems. Should one write about what interests the writer, or should it be of interest to the reader? Shall the article be original without looking at previous articles, or lifting paragraphs and pages from articles that are recognized as authorities on the subject? This original article will ramble around, like one rambles or walks through a garden.

One of the big worries of people who had lovely camellias, azaleas and rhododendrons growing in their own private gardens in the Pacific Northwest was, what damage, if any, did my plants suffer this past 1949-50 winter? No doubt many home owners who are fortunate in having camellias, azaleas and rhododendrons hated to look out of their windows at the snow and ice-laden plants. The temperature had gone down to an even zero Fahrenheit, there was much wind, and the sun came out brightly at times. The prospects looked dark. Finally, after the snow had melted, one could tour his garden; many of the choice camellias, some grafted plants and some on their own root systems, were broken down. Many of us taped up the broken limbs with rubber tape, some of the limbs having to be cut off, and some of us just waited. All around us we heard, "leave the plants alone"; this proved to be the best advice. The final results showed that some of the smaller limbs that were taped healed in the spring.

Of the three types of plants, the camellias took the worst beating from the winter. The writer has about sixty plants of each. About 35 per cent of the camellias suffered broken limbs; the hardy Kurume Azaleas, along with *Azalea mollis*, came through the winter without any noticeable damage. The rhododendrons did not have any broken limbs, and out

of sixty plants only two were lost by the severe winter. The two plants lost were "Sarita Loder" and *fragrantissimum*. However, there were two "Sarita Loder" in the garden; one was lost, but the other came through and bloomed during the month of May. Many buds were frozen on "Sarita Loder," about 80 per cent of them, so the resulting bloom was cut down to 20 per cent of normal.

The hardy A and B rhododendrons came through the winter without any noticeable change. The two rhododendrons lost had their bark split which caused their final demise. All the plants growing in the garden are outdoors without any artificial protection. A long hedge of rhododendrons did not suffer from the zero temperature; the plants on the east side of the home did well. Those that were alone, without any nearby plant, had more damage. The huddling plants seemed to protect each other, while those alone had a harder time. This fact seems borne out in the relation of human society, as well as in plants. It also was noticeable that some leaves of the three types of plants turned brown in the spring and summer of 1950, while the lower limbs near the ground did not. The latter were completely covered by snow, which seemed to act as a blanket of protection. The plants that were most damaged were those that received the noonday sun while they had a thick coat of ice on the plants. From observation, one can draw a conclusion that the more one lives with plants, the more they react like human beings. It is rapid change of temperature, from cold to hot, back to cold, that will cause many people to suffer from pneumonia, or at least have a disagreeably bad cold. The same with plants. A cold, icy night, then a bright winter sun, together with a cold wind, both from the north and the southwest, was too much for the plants to take in their stride. Out of sixty rhododendrons, two plants died. This was not determined until about the month of August, 1950, as one always had hopes. There

*Mr. John W. Schaefer, Olympia, Washington, is a charter member of the American Rhododendron Society and has been an enthusiastic amateur gardener for many years.

did not seem to be any difference between a plant on its own roots, or one that had been grafted.

Experimenting with one camellia plant, *grandiflora alba* ("Lotus"), which was protected by a heavy woolen blanket during the cold weather, it was found that the leaves and buds were cooked, and during the summer months all these dropped off. About the month of June, the dead limbs were cut back from this 4-foot "Lotus" plant to within 6 inches of the level of the ground, and within a short two months new growth was over 12 inches in length. However, no new buds have formed for next season. The fine root system down in the sandy soil went to work, and under its pressure the new growth seemed to shoot skyward. From this experiment one can readily see that it is dangerous to completely cover a plant during the winter, because no air could circulate, and the plant just smothered to death. Therefore, it is much better to allow the plant to go through the winter breathing, and take a chance, rather than to smother it. Another experiment tried was to drive stakes around several plants, and then slip loosely woven onion and potato burlap sacks over the stakes and plants. The plants used were the smaller ones from 18 inches to three feet in height. This kept the snow weight down, the plants did not have to bear the brunt of the snow and ice, and the plants could also breathe through the burlap sack. All of the plants which had this protection came through the winter in fine condition. Before putting on the burlap covers, a three-inch mulch of finely ground peat was placed above the root system. Small sticks were also driven through the burlap sacks at the ground, so that the wind would not blow or whip the sacks around the trunks of the plants. Just as soon as the snow had left, all the protective measures were removed.

All azalea plants came through the winter in good condition. Of course *Azalea mollis* is rugged and has taken a lot of severe weather, while the evergreen Kurume azaleas, especially the spreading ones, did not break

down, nor were they affected by any loss of buds.

One or two rhododendron plants had their buds frozen, namely "*Gill's Crimson*" and "*Sarita Loder*." All the rest bloomed during the months of May and June, 1950.

Camellia reticulata, a plant now 5 feet high on a 14-inch graft, grew this last spring, but the zero weather caused the buds to become frozen, and they were removed by hand during the blooming season of April. This particular plant is now on the east side of the home, about three feet from a warm wall, protected from prevailing winds and noon-day sun. It will be interesting to watch it during the winter months. It now has (November) many buds on it and if this coming winter is not too severe there is a hope that it will bloom next April.

After the winter was over no fertilizer was used except a handful of Epsom salts scattered around each plant. It was felt that if these plants in the garden were convalescing, they should be treated in a similar manner to a convalescing person and have a sparing diet.

More and more, as one lives with or near plants, one thinks of them as animate persons growing up like children. Overstuffing them with food, or coddling them, is just as bad as neglecting them. This same rule applies to a human being. All they need is a chance; if they can be given a place in the garden with about the same condition as they originally were located in their native habitat, then they will thrive. One can drive around and see neglected gardens where homes once stood, and big, beautiful rhododendron plants blooming in a profusion of glory. They seem to flower better when they are starved than when they are too comfortable and well-fed.

In the footnote accompanying Mr. T. J. Walsh's article on the Botanic Gardens, Glasnevin, Dublin, Ireland, we located Glasnevin in North Ireland and are herewith happy to correct to the proper location in "Southern Ireland."

The Arboretum Bulletin

VOL. XIII, No. 4 SEATTLE, WASH. WINTER, 1950

No part of this BULLETIN may be reprinted without the authority of the Arboretum Foundation.

ARBORETUM FOUNDATION OFFICE HOURS

9 a. m. to 4:30 p. m.
Monday through Friday
Phone MInor 4510

ARBORETUM FOUNDATION OFFICERS

W. F. PADDOCK, *President*
S. L. SAVIDGE, *Vice-President*
MRS. PHILIP MACBRIDE, *Vice-President*
JOHN H. HAUBERG, JR., *Vice-President*
MRS. JAMES W. WYLIE, *Secretary*
THOMAS YOEULL, *Treasurer*
MISS GENE WEBB, *Executive Secretary*

BULLETIN EDITORIAL BOARD

MRS. J. THOMAS DOWLING, MRS. E. B. HANLEY,
MRS. O. B. THORGRIMSON, BRIAN O. MULLIGAN,
CLARENCE PRENTICE, BRYAN TAYLOR
C. FRANK BROCKMAN

Special Notice

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears and previously established \$2 memberships more than thirty days in arrears will be dropped and THE BULLETIN will be discontinued.

Arboretum Membership Blank

- | | |
|---|----------|
| <input type="checkbox"/> Active | \$ 5.00 |
| <input type="checkbox"/> Contributing | 10.00 |
| <input type="checkbox"/> Supporting | 25.00 |
| <input type="checkbox"/> Sustaining | 50.00 |
| <input type="checkbox"/> Sponsor | 100.00 |
| <input type="checkbox"/> Life | 500.00 |
| <input type="checkbox"/> Endowment | 1,000.00 |

The Arboretum Foundation,
University of Washington Arboretum
Seattle 5, Washington

I hereby apply for membership in the Arboretum Foundation and remittance for same is enclosed to cover dues for the next succeeding 12 months.

Name.....

Address

All memberships are non-assessable.

Notes and Comment

AT THE 26th annual convention of the National Shade Tree Conference, held at Syracuse, N. Y., in August, a Canadian chapter was formed. British Columbia is therefore now included in the Western Chapter of the National Shade Tree Conference, which extends throughout the western states to Utah, Arizona and New Mexico. The next convention of this chapter, of which Mr. George Hood, Jr., is the secretary (P.O. Box 1218, Palo Alto, California) will be held at Portland, Oregon, in June, 1951.

New officers of the Northwestern branch of the American Rock Garden Society are: Chairman, Mr. Albert M. Sutton.

Program Chairman, Mrs. B. O. Mulligan. Secretary-Treasurer, Mrs. L. N. Roberson, 1539 East 103rd Street, Seattle 55.

Those interested are cordially invited to attend the monthly meetings, dates and locations obtainable from the secretary.

The annual membership meeting of the Arboretum Foundation was held on October 23 in the Auditorium of the University's Health Sciences Building.

New Arboretum Foundation officers elected were:

W. F. Paddock, President.
S. L. Savidge, Vice-President.
Mrs. Philip Macbride, Vice-President.
John H. Hauberg, Jr., Vice-President.
Thomas Youell, Treasurer.
Mrs. James W. Wylie, Secretary.
Miss Gene Webb, Executive Secretary.

Members elected to serve on the Board of Directors for the forthcoming year were: Mrs. Clarence Blethen, Harry S. Bowen, Mrs. Frank Calvert, Jr., Mrs. Emil Sick and Roscoe C. Torrance.

Re-elected to the Board for a one-year period were: Mrs. Raymond B. Allen, Mrs. J. Swift Baker, Ceibert Baillargeon, Mrs. Carl McN. Ballard, Dave Beck, Ira W. Bedle, William Blethen, Mrs. Lawrence Bogle, Mrs. Burle D. Bramhall, Mrs. James Brennen,

Mrs. Frederick A. Bunge, Mrs. Wm. Calvert, Jr., M. M. Chism, Newman Clark, Mrs. Herbert E. Coe, Herbert L. Collier, Mrs. J. Thomas Dowling, Ben Ehrlichman, Mrs. Henry C. Field, Mrs. W. A. Fisher, Edward I. Garrett, Donald G. Graham, Mrs. Loren Grinstead, Clinton S. Harley, Mrs. Charles L. Harris, R. Bronsdon Harris, John H. Hauberg, Jr., Mrs. Langdon C. Henry, Mrs. Alexander Hepler, Dr. Jackson K. Holloway, Albert F. Hull, Mrs. Harry B. Jones, Dr. Brien King, Mrs. Arthur J. Krauss, Mrs. Harry R. Lawton, Roy S. Leighton, C. B. Lindeman, Mrs. Philip Macbride, Dean Gordon Marckworth, Roy L. Maryatt, Mrs. Alexander McEwan, Miss Annie McFee, Darwin Meisnest, Winlock Miller, Dr. Walter A. Moore, W. F. Paddock, Mrs. Don Palmer, Howard W. Parish, Reginald H. Parsons, Mrs. Frank M. Preston, Mrs. Hazel Pringle, Victor Rabel, Mrs. F. G. Raines, Mrs. Chester Reitze, Edward L. Rosling, Mrs. John E. Ryan, S. L. Savidge, Mrs. Stanley S. Sayres, Mrs. William D. Shannon, Sterling Stapp, Mrs. C. W. Stimson, Mrs. Harold B. Thompson, O. B. Thorgrimson, P. B. Truax, Nelson A. Wahlstrom, Dr. Frank Wanamaker, Charles S. Wills, Mrs. James W. Wylie and Thomas Youell.

Out-of-town members of the Board of Directors, also elected for a one-year term, were: Mrs. W. H. Abbott and Mrs. A. R. Walker, Bellingham; Mrs. R. L. Alleger, Centralia; Arthur S. Cory, Chehalis; Mrs. R. L. Rutter, Ellensburg; William Pilz, Everett; V. I. Whitney, Montesano; Mrs. G. O. Moen, Mount Vernon; Mrs. Walter B. Beals, Olympia; T. A. Merrill, Pullman; Mrs. George Cropper, Shelton; Joel E. Ferris, Lawrence R. Hamblen and Dean Chas. E. McAllister, Spokane; Mrs. Metcalf Fogg, Mrs. Howe Rushmore and Mrs. Corydon Wagner, Tacoma; Mrs. Fred Mason, Vancouver; Mrs. E. T. Adams, Wenatchee, and Mrs. O. R. Schumann, Yakima.

✓ ✓ ✓

PLEASE REMEMBER THE BULLETIN Advertisers when making your purchases. Always mention THE ARBORETUM BULLETIN.

Ludwig Metzger

Death came untimely to Mr. Ludwig Metzger, superintendent of the Medicinal Plant Gardens, College of Pharmacy, University of Washington, on the morning of September 18. Mr. Metzger, who enjoyed the high esteem of faculty and students alike, passed away following a brief illness at the age of sixty-seven. He had been associated with the University and College of Pharmacy staff for more than twenty-eight years and was internationally known for the many contributions made during that time toward drug plant cultivation, seed collections and plant exchanges with various universities and gardens throughout the world. Only last year he was made an honorary member of the Agricultural Commission of the Haiti government for help and information that he had given to this commission during the past few years. It was largely through Mr. Metzger's enthusiasm and zealous efforts that the Medicinal Plant Gardens at the University of Washington reached such renowned fame.

H. W. YOUNGKEN

✓ ✓ ✓

Jacob Umlauff

Horticulturists, not only in Seattle but throughout the nation, will feel keenly the loss of Jacob Umlauff, long-time maintenance superintendent of the Seattle Park Department, who died November 10.

Born in Germany, Mr. Umlauff came to Seattle in 1892, a short time after he arrived in the United States. He decided to make Seattle his home after seeing a camellia blooming in the winter.

Appointed as maintenance supervisor of the city parks in 1913, he remained in that position until his retirement nine years ago, refusing several times to join private outside interests in devotion to Seattle and his work.

The many parks and boulevards beautifully landscaped under Mr. Umlauff's supervision will memorialize this devotion for years to come.

Book Reviews

The Art of Botanical Illustrations, by Wilfred Blunt, with the assistance of William T. Stearn, Librarian of the Royal Horticultural Society. Published by Collins, London, (1950). Price 21s.

THE comprehensive survey of botanical illustrations of the past five hundred years given in this highly informative book includes a wealth of collected material not discoverable in the ordinary path of search. This information has been brought to light by Wilfred Blunt, the author, who is an industrious and traveled scholar. He has given us a beautifully illustrated source book, containing forty-seven exquisite color plates, many from the British and Victoria and Albert Museums, and thirty-two black and white plates from the libraries and galleries of the Continent. There are a few plates shown from the Royal Library at Windsor Castle, which include three by Leonardo da Vinci—a study of the Madonna Lily (*Lilium candidum*—1479), one of a bramble (*Rubus fruticosus*—1503) and one of a wood anemone (1505).

Another interesting black and white plate is of the Martagon Lily (*Lilium Martagon*) etched by Pierre Vallet from "Le Jardin du tres Chretien Henry IV" in 1608. The great fondness for gardens and flowers of Henry's wife, Marie de Medicis, to whom this beautiful florilegium was dedicated, inspired the gift of a flower painting by Jacob de Gheyn from the States General in The Netherlands.

For those of us who have in the past perused and collected Herbals and found and enjoyed flower prints, here is a book which freshens and really revives one's interest. The basic research has been done and the result is at hand, so that one may enjoy it as a whole or do further reading and collecting in any classification one could wish, for the span of time and work is so great. There are the woodcuts of the herbals, the flower painters of the late 16th century, the early etchers and metal engravers, the work of Rabel, Robert and Aubriet, Ehret and Redoute and the British contemporaries, Kilburn, Sowerby and Sydenham Edwards, Frances and Ferdinand Bauer, Dr. Thornton and the "Temple of Flora," and so on to the present day.

At some future date and as a sequel to this volume it is expected that there will be published the "History of the Use of Flowers in Painting and Design," by Mr. Blunt. In the meantime, such books as "Flowers," the flower piece in European painting put out by New York's Metropolitan Museum of Art, or "Flowers" by Hermine Van Guldener, a Dutch translation, are both reading helps. Specific paintings in the flower books are of great aid in retaining the painters' identifications as one reads this type of book. The old Redoute prints, Dr. Thornton's "Temple of Flora" and those of Mrs. Bury are perhaps the finest prints we have found in the past. The others, generally speaking, remain relatively unknown. The "sources of further information" (appendix C) is the real joy for parallel study. Among the one hundred or more listed articles and books is Gordon Dunthorne's "Flowers and Fruit Prints of the 18th and 19th

Century," (Lakeside Press item U. S.; also London, 1938) a gem to be read or re-read.

V. Sackville West, Sir John Squire and Lord Aberconway are among those whose London reviews are most laudatory. It seems especially fitting to end with this paragraph of praise from Sacheverell Sitwell in the "Spectator": "The text is as interesting and lively as the illustrations, and one compact mass of information. In fact, it is comparable to one of those old-fashioned bull's-eye peppermints the joy of which was that they were so long in time consuming. To many, indeed to most outsiders, it is a new world of beauty . . . I hope that I am conveying something of the excitement of reading and looking through this book of flower drawings. "The Art of Botanical Illustrations" is unlikely to be superseded, except for particular studies, for a very long time."

MRS. JUDSON FALKNOR

A Natural History of Trees of Eastern and Central North America, by Donald Culross Peattie. (Houghton Mifflin, Boston, 1950). 606 pages, illus. \$5.00.

THIS BOOK can be most readily described in one word—charming. Written in the inimitable Donald Culross Peattie style, the great mass of information contained is both technically accurate and interestingly presented. Consequently it should have a wide appeal to those who are interested in this subject strictly from the botanical angle, as well as to those who enjoy "browsing" in good literature.

In addition to the usual information found in most textbooks on this subject, Mr. Peattie has included much additional material, compiled from a wide variety of sources and from his own observation, that most adequately paints an appealing word picture of each species included. And to those interested in encouraging greater interest in natural history on the part of the layman, one cannot help but admire the manner and the technique used in making such facts—often considered as "dry" by the uninitiated—so appealing.

As the title of the book indicates, the species dealt with are those that are not native to this region. Yet many of these same individuals have been introduced into our landscape—our gardens, parks and along our streets. Finding them here we can, by reading this book, gain a greater appreciation of their interest, beauty and values as one finds them in their native environment.

And since this book is the forerunner of a series on trees in various sections of the country, one finds himself reading it in keen anticipation of a later volume dealing with "word pictures" of trees which are part of his daily experiences.

C. FRANK BROCKMAN.

Mr. Mulligan has recently been elected vice-president of the American Rock Garden Society.

A *Fuchsia Survey*, by W. P. Wood, President of British Fuchsia Society. Williams & Norgate, Ltd., London (1950). Price \$2.00.

IT IS a privilege to read a new book about the fascinating Fuchsia by such an authority. The history of any plant is interesting but doubly so if a person is an enthusiast of that plant. Pere Plumier first described it as *Fuchsia triphylla flore coccineo* in 1703, whose illustration is given in detail. The name Fuchsia was derived from Leonhart Fuchs and descriptions of his life and achievements give us thought. The probable date of cultivation in Europe is 1786-89, in England 1793, and in America probably 1870. There are many species, some never introduced to cultivation. Dr. Munz' book on the genus Fuchsia is quoted and, as it is out of print, this is invaluable.

Great stress is laid on soil, for no plant can grow at its best in poor soil. Compost is mentioned, with peat, leaf mould, sand and decayed manure. Propagation is by grafting, seed and cuttings. The last are illustrated—ultra green tip, normal green tip and semi-hard with heel.

In England most Fuchsias are grown as greenhouse plants, but when grown outside many different methods of protection are described. The training of different forms, Bush-Standard, Cordons-Pyramids, Climbers, Baskets and Conicals is very clear and ample. The chapter on Species and Varieties is very interesting as many in England are not grown here.

When it comes to dealing with insect pests the illustrations and descriptions of methods of combat make it very plain. Under healthy conditions Fuchsias are seldom bothered. The uses of Fuchsias in the garden are various and stimulate one to try new places. Hybridising is technical for the amateur and definite descriptions are found which will aid in that art.

The Fuchsia was a war casualty as many were sacrificed for food production. Now the exchange between the ample number in America and the new varieties appearing in England will make Fuchsias more alluring to both countries.

The last words in the book are: "To all Fuchsia growers and lovers, wherever they may be: Greetings, and on to more and better Fuchsias."

GEORGIA N. EATON

Winter Takes Its Toll

(Continued from Page Fourteen)

I had the finest *Loderi* display in years. All the other standard hybrids rated "A", "B", and "C" were uninjured, excepting "Fabia" as mentioned above. Some "D" and "E" were defoliated but none lost.

After a winter such as the last many of us look for reasons that might account for our losses. Of course we can find many but it is difficult to be sure we are properly applying them, and since experienced, scientific growers often differ you may draw your own conclusions from my comments.

It is axiomatic that a healthy, well-grown plant will withstand severe weather better than a poorly grown one. I am equally sure that a pampered, overfed plant is almost certain to be injured by severe weather, especially if it has been subjected to late summer feeding and overwatering. Both of these things stimulate second growth which is almost certain to be injured by a hard winter or an early freeze. It is important, therefore, that new growth have a chance to mature or "harden off" well before the cold weather sets in. Second growth may be fine if you have a mild winter but it not only reduces your flower crop but may easily be lost by winter.

Air drainage has been covered so often that it should need no further comment. Lack of it is undoubtedly one of the reasons why many nurseries located on low ground suffered so severely. Windy or draughty locations can be equally disastrous to many plants. At one corner of my house, a three-foot *cilpinense* was cut to the ground while a similar plant only six feet away was unharmed and flowered as usual. "Penjerrick" was also in a windy location and all of its leaves were "burned" but the flower buds were not injured.

In conclusion I feel there is little need to worry about the future of rhododendrons in the Pacific Northwest. In fact, the past winter proves beyond doubt their ability to withstand the severest test in over half a century. Some adjustments of location may be necessary with the more tender varieties and the average gardener should confine his selection to those of known hardiness, of which there are legions. The borderline plants are for the collector, the specialist or the scientist, but the merit and beauty of the genus is firmly established.

The American Camellia Quarterly, October, 1950, includes a list of judges as approved by the A. C. S. to aid show chairmen in selecting judging personnel for prospect camellia shows. We are pleased to note under Seattle, Washington, one name appears—that of our co-editor, Mrs. O. B. Thorgrimson.

ARBORETUM NOTEBOOK

This department is published for correspondence and pertinent comments by experienced growers on interesting plants and their culture. We solicit your questions but space limitation necessitates the publishing of only such answers as we deem of general interest.

IT SEEMS strange that the Grootendorst roses are so seldom seen in gardens. There are two varieties, one with red and one with pink blooms. I first saw the pink variety, years ago, in Mrs. Butchart's garden in Victoria and was charmed with it. In color, shape and size the bloom resembles, with notched petals, a superior pink carnation growing in large free clusters, Polyanthus type. The foliage is very decorative, a clean, light green. The bush is not particular about soil, giving its best in every situation like all *rugosa* roses. I have had the pink variety in my garden thirteen or fourteen years. It is one of the first to bloom in early June and it is still beautiful this rainy November 15. It is believed the parents of these roses are *R. rugosa* and *R. "Madame Norbert Levavasseur,"* however *R. fimbriata* may be one of the parents. The thorny stem obviously came from the *rugosa* strain. These two roses were produced by F. J. Grootendorst in 1918. They are not roses for the hybrid rose garden, being too free-growing for this company. Rather they should be planted in the shrub border where they will repay their cost many times over.

G. T. D.

A good combination: *Pinus ponderosa*, the dominant plant with *Hamamelis mollis* and *Rhododendron mucronulatum* under it. Patches of *Narcissus Bulbocodium* var. *citrinus* complete an exquisite color picture in early spring.

In a late book on English gardening there is a statement that English gardeners do not think it necessary to plant a shrub with a ball of earth; the dirt is always washed off. This is a good subject for investigation. May we have reports of local experiments?

UNIT No. Two,
LAKE WASHINGTON GARDEN CLUB

Because the season was slow in warming up last spring and the ground was cold I tried three series of planting sweet pea seeds. First planting was the third week in February. Just as the peas were coming through the ground I planted a second row in front of the first planting. In three weeks I planted my third row. They bloomed abundantly and I pulled the vines, which were still blooming, though ragged, yesterday (November 11). I tried the same three-plantings idea with blue *Viscaria*, the little border plant which I first obtained from Butchart. The third planting is still a mass of bloom, too pretty to destroy.

GRACE MORGAN

Some members of this group have used the spray 2-4-D to drive away moles. Squares of cloth soaked in 2-4-D spray were imbedded in the mole runs. The lack of mole holes was almost immediately noticeable.

Sixteen drops of household ammonia to a gallon of water is an old tried and proven recipe of keeping house plants well and happy. Water

the plants every two weeks with the solution.

When chrysanthemums seem unreasonably slow producing buds in late summer, try watering the soil with a solution of sulphate of ammonia.

Yellow roses usually are the first to open in the spring and are the last to bloom in the fall.

VERA POOLE ARBORETUM UNIT.

✓ ✓ ✓

Rt. 1, Port Hammond, B. C.

October 5, 1950

Dr. B. Mulligan, Director,
U. of W. Arboretum

Dear Sir:

Last spring I suggested sending a report to you on hardiness of shrubs in this vicinity. Rather tardily I am doing this, largely because our last winter's minimum of -3° F. (reached twice, and measured on a good minimum thermometer by an ex-meteorologist) was possibly lower than any experienced in the Seattle area. Herewith the list:

Killed

Berberis Darwini
Lonicera nitida
Camellia japonica (Cheerful?) large bushes;
(my own small camellias under the snow survived and bloomed)

Cut to the ground

<i>Photinia serrulata</i>	} Made excellent growth this year
<i>Abelia grandiflora</i>	
<i>Nandina domestica</i>	
<i>Rhododendron "Fabia"</i>	

Cut to snow line

Aucuba japonica
Escallonia langleyensis
Cotoneaster horizontalis; *C. Simonsi*
Garrya elliptica
Osmanthus Delavayi; *O. ilicifolius*
Osmarea Burkwoodi (some branches survived)
Pernettya mucronata
Prunus Laurocerasus
Pyracantha Rogersiana
Rhododendron chartophyllum praecox
Viburnum Tinus

Defoliated

Cotoneaster salicifolia; *C. Francheti*
(some branches killed)
Ligustrum ovalifolium
Stranvaesia Davidiana
Ilex Aquifolium (partial, and variable with individuals)

Flower buds killed above snow line

Corylopsis pauciflora
(a few branches also killed)
Pieris japonica (*P. floribunda* O.K.)
Rhododendrons *Augustini*, *yunnanense*,
"Unique," *charitopes*, *calostrotum*, *molle*
(some)

Most *R. obtusum* were covered with snow but exposed buds and branches were killed in some cases.

Skimmia japonica

Foliage burned

Rhododendrons Augustini, Fargesii, Thomsonii, "Unique" (No flower buds on R. Fargesii or Thomsonii—plants too small)

Viburnum Davidi

On the whole I am glad that most of my plants were small enough to get some protection from heaped up snow. The only really hardy Cotoneaster was C. Dielsiana—I was surprised at C. horizontalis away from a wall and at C. Simonsi. On the other hand, Ceanothus "Henri Desfossé" was killed just to the snow and flowered extravagantly this summer. We also had excellent bloom from a variety of Hydrangea hortensis—this on new growth since the last season's was killed.

Several of our dogwoods (C. Nuttallii) suffered severely and have not yet recovered. This was partly but not altogether due to bark splitting.

That seems to include the casualties and near casualties. Of course, the plums, cherries, crabs, viburnums and many others were seemingly not affected. The zone 5's and 6's didn't seem to suffer except as noted. I hope this report will be of some use.

Yours very truly,

(signed) R. E. G. LANGTON

1 1 1

Institute on Modern Living

One of the most unusual and gratifying projects sponsored by the Arboretum Foundation in many years was that conceived and promoted recently by the Ways and Means Committee of the Foundation under the most capable chairmanship of Mrs. Arthur J. Krauss.

With the cooperation of the Adult Education Department of the University of Washington and the Washington State Chapter of the American Institute of Architects, an "Institute on Modern Living" was presented to the public on October 3, 4 and 5 at the University's new Health Sciences Auditorium.

The Institute included three lectures, three round-tables and a panel discussion by the main speakers—all pre-eminent in their fields; Mr. Richard Neutra, architect; Mr. Charles Eames, designer, both of Los Angeles, and Mr. Lawrence Halprin, landscape architect of San Francisco.

The enthusiasm and interest shown by the four hundred registrants for the course, especially notable during the round-table discussions, points with unanimous approval to other such stimulating endeavors.

A sum of \$2,700 profit from the Institute was forwarded to the University to be used in the development of the University of Washington Arboretum.

1 1 1

LIST OF PLANT NAMES

(Continued from Fall, 1950)

<i>clavus</i>	club
Claytonia	after John Clayton of Virginia
Cleistocactus	closed cactus
<i>clematideus</i>	like clematis
Clematis	Greek name of climbing plant
<i>clethroides</i>	clethra-like
Clerodendron	Greek, chance and tree
Clethra	ancient Greek name of alder
Clianthus	Greek, glory-flower
Cliftonia	after Dr. Francis Clifton, an English physician
Clintonia	after DeWitt Clinton, famous governor of New York
<i>clivorum</i>	of the hills
Clivia	after Duchess of Northumberland, member of Clive family
<i>clypeolatus</i>	with or like a shield
Clytostoma	Greek, splendid
Cnicus	Latin for safflower (thistles)
<i>coarctatus</i>	crowded together
Cobaea	after Father Cobo, Spanish Jesuit naturalist
<i>coccifera</i>	berry bearing
<i>coccineus</i>	scarlet
Coccinia	Latin, scarlet
Coccolobis	Greek, lobed berry
Coccothrinax	a berry and Thrinax (berry-like fruit)
Cocculus	diminutive of Kokkos-berry
Cochlearia	Greek, a spoon
<i>cochleatus</i>	spoon-like
Cocos	Portuguese monkey, from nut which suggests a monkey's face
Codonopsis	Greek, bell-like
Coelia	Greek, hollow
<i>coelestis</i>	sky-blue
Coelogyne	hollow pistil
Coffea	from the Arabian name for the drink
<i>cognatus</i>	related to
Coix	an old Greek name
Colchicum	from Colchis, Asia Minor
<i>colchicus</i>	of Colchis
Coleus	Greek for sheath
Colletia	after Philibert Collet, French botanist
Collinsia	after Zaccheus Collins, American scientist
<i>collinus</i>	pertaining to a hill
Collinsonia	after Peter Collinson, English botanist
Collomia	Greek for glue
Colocasia	old Greek name
<i>coloratus</i>	colored
Colquhounia	after Sir Robert Colquhoun
<i>columbianus</i>	Columbian, Western North America
<i>columellaris</i>	pertaining to a small pillar or pedestal
<i>columnaris</i>	columnar

(To be Continued)

In the Arboretum

Effects of Winter on Trees and Shrubs

(Continued from Page Four)

First plantings made in March, 1948. Effects of the low temperatures and cold winds were very obvious, but recovery has been good in most species and generally better than anticipated, including some species thought dead (*I. attenuata*, *I. insignis*, *I. Oldhamii* and *I. rotunda*); these four have all made new growth from the base during 1950, though whether they will survive the coming winter remains to be seen.

Defoliated also were *I. cornuta*, and especially var. *Burfordii*, and the leading shoots of *I. Cassine*. These likewise have put forth vigorous new growth, especially *I. cornuta*. The only form of *I. Aquifolium* to show any damage was var. *argentea marginata*, in which two out of four small plants were killed to snow level, recovering subsequently. The leaves of *I. latifolia* and *I. Pernyi* were discolored, but later growth has been normal. No other evergreen Hollies were affected.

Oaks

In a lower area of the Arboretum; soil varying from light and stony to heavier and wetter. Planted 1937-1940.

Killed:

Two *Quercus acuta* out of three plants, about 4 feet tall. This is an evergreen Japanese species.

Killed to Ground:

Q. agrifolia, the Californian Live-oak, 12 to 20 feet. Two of these were believed dead in April, but all three subsequently produced fresh basal shoots.

Foliage and Shoots Damaged or Killed:

Q. virginiana, the Live-oak of the south, and two trees of a group of five of the hybrid *Q. ludoviciana* (*Q. subfalcata*). Both these, however, made satisfactory new growth by October.

Rhododendrons

Arranged by series (excepting *R. Griersonianum*). Almost all grow on west or north slopes, frequently under maple, Douglas fir or other trees and sheltered by them from

east and south. Soil light and well drained; plants mulched at least biennially, if not annually.

Arboreum. Many specimens of *R. arboreum* 6 to 9 feet tall, planted about twelve years, either killed or so severely damaged as to be not worth retaining. Those beneath or close to conifers (western Hemlock) least affected. New shoots produced at base where main stem killed. This loss may possibly have been due to cold air passing down the narrow valley where these plants are growing. Such an effect was noted also on Camellias nearby. "Sir Charles Lemon." Young plants largely defoliated; one died, two survived.

Boothii. *R. auritum*, killed to ground level, but growing again from stumps. In *R. deleiense*, *R. tephropeplum* and *R. leucaspis*, many branches killed but recovery good, especially in two former; flower buds formed.

Cinnabarinum. No damage observed to type or var. *Roylei*.

Fortunei. On the whole suffered very lightly; most are large plants 5 to 10 feet in height. Most damaged was *R. Griffithianum*, as was expected; one plant of three killed, the other two dead to ground level, but recovering slowly by October. Height 3 to 4 feet. The finest form of *R. decorum*, with large, substantial white flowers, had many branches killed, but survives in weak condition; other normal forms of this species slightly injured or not at all. The foliage of *R. orbiculare* was somewhat burned. Unharmed were *R. discolor*, *R. erubescens*, *R. Fargesii*, *R. Houlstonii*, *R. praeevernum* and *R. sutchuenense*. The last was in full flower at the end of March and several others also bloomed in normal fashion. This experience suggests a wider trial of these species in colder climates.

R. Griersonianum and hybrids. Many plants of this species were either killed or cut to the ground, despite being placed on a steep bank to provide quick air drainage. Of the few hybrids growing in the Arboretum, the upper branches of "Daydream" above the snow were defoliated; "Fusilier" was killed to the ground but has made fresh basal growth, like the surviving *Griersonianum* plants;

"Azor," "Fabia," and "Romany Chai" suffered only from temporary leaf scorching.

Maddenii. The greatest losses, as might be anticipated, occurred in this series. *R. Dalhousiae*, and some plants of *R. crassum* and *R. Lindleyi* were killed. The plants of *R. crassum* were 2½ to 3 feet tall; results were identical in two widely separated plantings. Basal growth was made in late summer and fall by the survivors. Killed to snow level were: *R. formosum*, 4 to 5 feet; *R. fragrantissimum*, up to 3 feet, planted in two different sites, one very sheltered and dry; *R. Johnstoneanum* and "Lady Alice Fitzwilliam." Many branches were killed on *R. ciliatum* but growth during the summer was normal and plenty of buds are evident.

Thomsonii. Maximum damage comprised leaf scorch and killing of buds of the following species: *R. campylocarpum*; *R. cyanocarpum*; *R. Thomsonii*. Leaf scorch only in *R. telopeum* and *R. Williamsianum*. Of the hybrids, "Bow Bells" was uninjured, but in "Penjerick" all terminal buds were killed, the foliage severely burned, and subsequent growth was poor, no doubt due to the influence of *R. Griffithianum*, one of the parents.

Miscellaneous

(1) In borders around greenhouses and offices.

Most of these face south and are exposed to morning sunshine, a serious factor in producing damage during periods of low temperatures. The following were killed here: *Caryopteris clandonensis*; several *Ceanothus* species already mentioned; the red *Diplacus*

parviflorus; the Chilean *Fabiana imbricata*, 4 feet high; *Fremontia mexicana*, 5 years old; *Leonotis Leonurus*, from South Africa, which flowered the previous autumn; all *Leptospermum scoparium* forms, including *Nichollsii* and the double *flore-pleno*; the Tasmanian *Prostanthera lasianthos*, and *Senecio laxifolius*, well-established old plants.

Cut to ground level: *Carmichaelia australis*, one of the so-called pink Brooms, native of New Zealand; *Daphne odora* var. *alba*, on a west wall; *Diplacus aurantiacus*, in the same site; *Lavandula Stoechas*, a Lavender of the Mediterranean area; *Penstemon antirrhinoides*, *P. cordifolius*, *P. corymbosus*, all Californian, and the hybrid known as "Giant Ruby," of Mexican ancestry; the Asiatic *Pittosporum Tobira*, previously quite hardy with us; the double Pomegranate, but the dwarf form was less injured and flowered later in the year, and *Teucrium fruticans*, a grey and silver shrubby sage-like plant.

Two South African bulbous plants of which the foliage was entirely destroyed but which flowered subsequently were *Agapanthus (orientalis and Weiligii)* and a *Eucomis*, probably *E. undulata*. The evergreen *Viburnum odoratissimum*, 8 to 9 feet high against a west wall, was considerably burned, but now looks normal again.

(2) In lath-house (with lath side walls and ends).

In the collection of 89 varieties of Fuchsias protected by a covering of dry bracken about 12 inches deep, one-third (30 kinds) was lost; this included "Bella Forbes," "Butterfly,"

For GIFTS and FLOWERS of Unmistakable Distinction

J. Crissey
FLOWERS • GIFTS

1329 Fifth Avenue

MAin 1100

"Catalina," "Fritz Kreisler," "Gypsy Queen," "Marinka," "Otto," and "Sunray," amongst others. Survivors included "Alice Hoffman," "Aurora Borealis," "Black Prince," "Caledonia," "Cupid," "Display," "Henri Poincare," "Jupiter," "Mephisto," "Mrs. Popple," "President," "Rose of Castile," "Symphony" and "Whitemost." All these bloomed later in the year.

As the lath-houses are at one of the lowest levels in the Arboretum they give very little protection in cold weather, except to break the force of wind. Some young Rhododendrons and varieties of *Camellia japonica* and *C. Sasanqua* suffered severely here also.

(3) In the Arboretum.

Evergreen shrubs killed to snow or ground level: *Arbutus Unedo*, 12 years old, two out of three in group; remaining one much less damaged; young plants in a more open situation on very light soil generally little affected; *Azara microphylla*, young plants. *Erica arborea*, 6 to 7 feet high; *Escallonia Iveyi*; *Gaultheria Wardii*; *Laurus nobilis*, the Bay tree, 5 feet tall in Cistus collection; *Leucothoe racemosa*; *Loropetalum chinense*, young plant; *Osmanthus Delavayi*; *Osmarea Burkwoodii* (in nursery); *Pieris formosa* in lower part of Arboretum, but not on bank by Upper Road where protected by Douglas fir; *Raphiolepis ovata*; in addition, all *Eucalyptus* were either killed or cut to the ground, though young plants of *E. coccifera*, *E. Gunnii*, *E. parvifolia* and *E. Perriniana* in the nursery survived and grew vigorously during the summer.

Less damaged, either defoliated or the shoot tips killed were: *Distylium racemosum*, of the

Hamamelis family; *Eurya acuminata*, about 4 feet tall, but transplanted in spring 1949; *Lyonia lucida*, the Fetter-bush, and *Sycopsis sinensis*, related to *Distylium*.

Nearly all these, whether killed to the ground or not, have made vigorous new growth during the year; a few such as *Distylium*, *Gaultheria*, *Loropetalum* and *Raphiolepis* are weakly.

A group which unexpectedly survived was the bed of *Hibiscus* hybrids of the *coccineus-Moscheutos* type planted near the offices, mulched in similar fashion to the Fuchsias. One or two succumbed, and all started growth later than usual, but finally grew to their normal height and flowered most freely in late summer and early fall.

Perhaps the most practical lessons to be learned from this experience are: (a) that overhead protection by evergreen trees, (b) mulching with a light, loose material such as dry bracken, (c) shelter from early morning sunshine, and, most important of all, (d) to choose a site where cold air does not flow or remain, will all considerably help to protect plants which do not appreciate temperatures below 10° F.

1 1 1

Haws Sprinkling Cans

A shipment of the famous Haws Sprinkling Cans has been received and is offered for sale by the Arboretum Unit Council. These cans, made in England, are far superior to anything obtainable in this country. Each holds five quarts and comes with two sprinkler heads.

Bunge Lumber & Hardware Co.

High Grade Peat Moss and All Types of Fertilizer

Including

Acid Fertilizer for Rhododendrons, Azaleas, Camellias, etc.

WEst 0022

9616 16th Avenue S.W., Seattle 6

Burien Yard, GLendale 1799

Orders may be placed through the Arboretum Foundation office, Minor 4510, \$8.75 each, including sales tax.

1 1 1

Mt. Airy Arboretum

(Continued from Page Six)

ieties will be added as they become available. Mt. Airy Arboretum now contains approximately 1600 species and a total of 7000 individual specimens. Although there has been an attempt to place plants in family groups, separations are necessary in some cases due to the arrangement of the Arboretum into tree and shrub groups, and because of culture, soil, moisture or exposure requirements.

Several years ago at the Annual Convention of the American Institute of Park Executives in Cleveland, Ohio, the American Association of Botanical Gardens and Arboretums was organized, and the Cincinnati Board of Park Commissioners became a charter member. This membership has provided the means for seed and plant exchanges, and the propagation and growing of new plant introductions for the Arboretum. Last year the Cincinnati Board of Park Commissioners established "The Mt. Airy Arboretum Foundation" in the interest of further development of the Arboretum. Future plans for the Arboretum include additional plantings, the construction of administration and herbarium buildings, and the preparation of a finding list and publications for general circulation.

1 1 1

PLEASE REMEMBER THE BULLETIN Advertisers when making your purchases. Always mention THE ARBORETUM BULLETIN.

Primula Juliae Hybrids
Choice Rock Plants
Dwarf Shrubs
Iris

CATALOG ON REQUEST

Carl Starker Gardens

Jennings Lodge, Oregon

Further Comments on Rhododendron Hybridizing

(Continued from Page Sixteen)

of the worth-while combinations have been made, but it is in the second and third generations that there will be new and very beautiful hybrids.

The same is true of *R. Griersonianum*, which has at least 110 primary crosses to its credit. Of course, first crosses with it can be and are still being made, but it is when it goes into the second and third generations, as with the *Neriiflorum* and other types, that medium growing, hardy plants, of all imaginable colors except blue, will be developed.

In the Azalea group, there are now many hundreds of named varieties, both evergreen and deciduous, and more coming on the market every year. However, they are all easy to raise from seed, and quick to bloom, so, for anyone who wants to raise a stock of plants in a short time, azaleas provide sure results. *A. occidentalis* is a good one to use for this area (the West), as it has not been overused, and hybrids from it will bloom in four or five years.

It may be thought that there is too much emphasis placed on rhododendron hybrids for the average garden. Many species, when planted correctly, as in Rhododendron Glen in the Arboretum, cannot be surpassed by any hybrid, but how many *average* gardens have the right conditions for them?

I will close with a quotation from Lionel de Rothschild, in the yearbook of the Rhododendron Association for 1934: "It may be asked why it is necessary to form hybrids when so many of the species are beautiful in themselves. The answer is a very simple one; the species has usually adapted itself to a particular climate, a particular rainfall, a particular resting period when it is covered with snow, even a particular variety of soil in its mountain home. The hybrid, which is a mixture, is often more able to adapt itself to the vagaries of our weather, nearly always more easily grown in our gardens and, being a hybrid, flowers at an earlier stage and often more freely than its parents."

Rhododendron Occidentale

(Continued from Page Nineteen)

tions of Maryland, Virginia and southward. Last year I found it to cross readily with various *molle* hybrids, commonly grown under name of *mollis*, and also with several clones of true rhododendron, especially *kewense* and *Loderi*. I found, however, that such seeds germinated slowly and that the seedlings have been much more difficult to establish than many others tried. Several individuals who are well acquainted with *occidentale* in its native habitat have told me that seedlings are difficult to find there, although hundreds of established plants occur on each acre of space.

Plants up to 5 feet tall are easily moved either from the wild or under culture, and respond well to the garden care usually accorded azaleas or rhododendrons. Many local observations indicate they thrive exceedingly well with very little care, but certainly deserve and respond well to good cultural practice.

It is to be hoped the day may be speeded when the species will be even more widely employed as a landscape subject than is now true, and that the time is not distant when our stock of fine ornamentals will be greatly enriched by the addition of many outstanding selections from it and its hybrids.

✓ ✓ ✓

PLEASE: Do not discard a copy of the BULLETIN. If you have no further use for yours, pass it along to a friend or return it to the Foundation. Return postage will be guaranteed.

✓ ✓ ✓

A REMINDER . . . that throughout the year the keen plantsman, amateur or professional, will always find something of interest at the University of Washington ARBORETUM.

✓ ✓ ✓

The Arboretum has given a large collection of rhododendrons, camellias and other shrubs to the Board of Park Commissioners, Vancouver, B. C., for the new Arboretum to be established there in Stanley Park, receiving in exchange collections of conifers and heathers.

Insect Pests of Rhododendrons

(Continued from Page Eleven)

about one week by the rough strawberry root weevil. The black vine weevil is the last one to appear. It has been found in numbers the first week in July, a period corresponding to the end of the strawberry harvest. The number of bait applications will vary, depending on how soon the weevils appear in the spring and the occurrence of rains. If it rains soon after the bait is applied, the treatment should be repeated.

New Insecticides

It has been found that root weevils can be destroyed by treating the soil under and around the trees or shrubs with dusts prepared to contain either 5 per cent chlordane or 5 per cent lindane. Application should be made early in May before any of the weevils have emerged. The chlordane dust should be applied at the rate of 200 pounds to the acre. This would be at the rate of one pound of the 5 per cent dust to 200 square feet. The lindane dust should be applied at the rate of 100 pounds to the acre or one pound of the 5 per cent dust to 400 square feet. The dust should be raked or worked into the soil to the depth of an inch or so.

The objective is to kill the adult weevils as they attempt to leave the soil. The insecticides can be mixed with fertilizer in order to increase volume and obtain more even distribution of the toxicant. Since the residual action of chlordane and lindane is known to last for several years, one treatment should be effective for several seasons. Booster treatments at two- to three-year intervals using from one-quarter to one-half the original dosage should maintain protection indefinitely.

PART II

PRINCIPAL INSECT PESTS OF THE GREENHOUSE

Certain insects may become pests in the greenhouse where rhododendrons are forced or propagated. In most instances, these are common greenhouse pests, showing little preference for the plants they attack. They seldom appear on rhododendrons or azaleas when growing under field conditions, but can do

serious damage to plants being forced or to stock being propagated. A brief discussion of some of the more common of these insects seems to be in order.

RED SPIDER

(*Tetranychus telarius* L.)

Rhododendrons are seldom injured by red spiders when grown out in the open under field conditions. Red spiders may become injurious to young stock being propagated under greenhouse conditions, however. These spiders (spider mites) are about one-thirty-second of an inch in length when full grown, are red-brown or green in color. When abundant they spin a fine silken web over the lower surfaces of the leaves, where most of them are to be found.

There are several generations of this mite each year, the generations overlapping so that all stages can be found in approximately equal numbers at any time. Development in the greenhouse is practically continuous throughout the year. The eggs are relatively large, spherical in shape and shiny in appearance. The mites feed by sucking out the plant juices. This causes the leaves to take on a fine, speckled appearance which is particularly noticeable on the upper surface. Heavy infestations, if left unchecked, may cause considerable injury.

Control

Red spiders can be controlled in the greenhouse by applying parathion or tetraethyl pyrophosphate as an aerosol from one of the aerosol bombs manufactured for the purpose. Wear a mask and follow the manufacturer's directions carefully. Contact sprays may also be applied for the control of these pests. These sprays should be applied to the lower surfaces of the leaves. If the infestation is well established and much webbing has been done, the grower may have difficulty in applying the spray effectively. These sprays should contain parathion or tetraethyl pyrophosphate as the active ingredient and should be prepared and used according to the manufacturer's directions. Contact sprays containing the extract from cube or derris roots (rotenone) are also effective and less hazardous to the

user. It is advisable to apply a second spray about a week after the first one to kill any mites not wet with the first spraying and to kill those hatching from eggs.

GREENHOUSE THIRPS

(*Heliothrips haemorrhoidalis* Bouche)

The greenhouse thrips is probably the most common of several species of thrips known to injure plants growing in greenhouses or in frames. The adult thrips is a flat, black-bodied insect with short legs and narrow, light-brown wings which lie along its back. It is about one-twentieth of an inch in length and quite active. The newly hatched nymphs are almost microscopic in size and practically colorless. As they grow, they become yellowish in color.

Thrips, like red spiders, have a number of generations each year. The eggs are deposited in the leaf tissue and the minute nymphs hatch in four to eight days.

The nymphs feed in colonies and reach maturity in from twenty to thirty-five days. Development in the greenhouse is practically continuous throughout the year.

These small, slender insects feed by rasping and rupturing the surface cells and lapping up the plant juices and chlorophyll. This causes the upper surfaces of the leaves to take on a blotched appearance, somewhat finer than that produced by lace bugs. The under surfaces of the leaves usually assume a silver-like appearance marked by small dark spots of excrement.

Control

Excellent control of thrips in greenhouses can be obtained by applying a dust consisting of equal parts of ground pyrethrum flowers and a 1 per cent rotenone dust. The dust should be applied from below so that it will billow up through the foliage, coating the lower surfaces of the leaves. Sulphur may be added at the rate of 25 parts to 75 parts of pure ground pyrethrum flowers, or as a diluent for the rotenone dust, the diluted dust to contain 1 per cent rotenone. The sulphur will also aid in checking red spiders and some diseases.

Contact sprays containing nicotine and

soap, pyrethrum extractives, or rotenone also give good control. One ounce of nicotine sulphate 40 per cent or of 50 per cent free nicotine (nicotine alkaloid) to six gallons of water plus three or four ounces of soap, makes an effective spray. Prepared sprays containing the extract from pyrethrum flowers, or that from cube or derris roots (rotenone) should be applied according to the manufacturer's directions.

Several of the new insecticides are also effective against this pest, such as chlordane, lindane, parathion or tetraethyl pyrophosphate. Prepare and apply these sprays according to the manufacturer's directions. DDT is very effective against thrips, but should be used with caution on rhododendrons.

1 1 1

About Rhododendron Varieties

(Continued from Page Thirteen)

which certainly makes it undesirable to give a fancy name to the entire group.

Many of the old hybrid groups are probably represented in the trade by only one clone; for example, "Goldsworth Yellow." However, according to the English system, a nurseryman could make the same cross at any future date and use the name for the offspring.

Presumably, Dutch and German varieties have been named as clones rather than groups. At least I find no evidence to the contrary in the literature. Most Americans will agree, I believe, that this should be the policy in this country. Variety names should be given to clones, definite entities which can be identified and reproduced exactly.

The American Rhododendron Society has recently set up a series of awards to be made to new varieties and, of course, only to clonal varieties. One Preliminary Award has already been made to Rhododendron "King of Shrubs" grown by Endre Ostbo of Bellevue, Washington. The Society has also set up an American variety rating system for both hardiness and general garden quality, and the first list of ratings published in the October, 1950, issue of the *American Rhododendron Society Bulletin*. The ARS is continuing its variety work by attempting to prepare a mas-

ter check list which will include pertinent information about varieties, as to origin and description. This should be useful to breeders in preventing duplication of names, giving them the parentage of varieties they might wish to use in breeding, together with brief descriptions.

Notes on English Rhododendrons

My remarks about specific varieties will be limited to a few scattered observations as much of my space has already been taken. I was very much impressed with the great number of species and varieties being grown in England, and the great wealth of garden material waiting for further development and distribution.

There was extensive use of the smaller varieties which would be especially well adapted to small homes in this part of the country. These small varieties range from very dwarf rock garden species to others which might reach three feet in height after years of growth. Of the latter type, the hybrids of *R. Williamsianum* were particularly outstanding. *R. Williamsianum* crossed with *R. orbiculare* gave "Temple Belle" which was particularly attractive at Wisley. This same species, crossed with *R. campylocarpum* gives "Moonstone"; with "Corona" it has produced "Bow Bells"; with *R. haematodes* it has given "Humming Bird"; with *R. Wardii* it has given "Cowslip," and there are many other hybrids. The species *R. Williamsianum* itself was used very effectively in ringing a garden pool at Bodnant, the estate of Lord Aberconway in North Wales.

Of the true dwarfs, none was more effective than *R. Hanceanum nanum* as seen in the garden of A. T. Johnson in North Wales. This is a bright lemon-yellow and very free flowering. At the Royal Botanic Garden in Edinburgh, Rhododendrons are used very freely in the rock garden. Among the species which particularly impressed me were *R. Sargentianum* with sulphur yellow flowers, *R. deleiense*, *R. tephropeplum*, *R. myrtilloides*, *R. impeditum*, *R. keleticum* and many others.

At Edinburgh there were, of course, many fine specimens of the larger growing species,

many of which are just as attractive and desirable as the named varieties. Three members of the Triflorum series were especially noticeable because they were so completely covered with flowers, although the individual flowers were not large. These three, which should be especially effective in general landscape use, are *R. yunnanense*, *R. chartophyllum* and *R. hormophorum*.

In the gardens in southern England, very effective use was made of *R. Augustinii* as background material in woodlands. It was most effective in groups which were seen from some distance, as the individual flowers are not as attractive as the general effect.

We saw many forms of "Penjerrick" which were noteworthy because of their good plant characters as well as their flowers. Of course, the various forms of *Loderi* were very much in evidence. I was also impressed by the variety "St. Probus" raised by Mr. G. H. Johnstone, and the varieties "Sunrise" and "Laura Aberconway," growing at Bodnant.

There were a number of promising new seedlings at the Rhododendron Show, and the breeders are still at work so that we may look forward to many more fine things from England.

Future American Varieties

A number of American breeders have been working to produce better varieties, especially those which will be better suited to our environment. A complete list cannot be given now and so I will mention only one, the late C. O. Dexter who started his work near Sandwich on Cape Cod in the early twenties. Many of his seedlings and selections were distributed to friends and to various botanic gardens, so there is not a complete set at any one place. Rhododendron authorities in the East have realized the importance of Dexter's work, however, and last winter took steps to tag and propagate a fairly large number of his selections growing at several different points. I had the pleasure of visiting his old nursery immediately after returning from England. Even with the magnificent English varieties fresh in mind, I was impressed with the large size and the free flowering of many of Dex-

ter's seedlings. Most of these were hybrids of which *R. Fortunei* was one parent. They were apparently quite hardy on that particular site near the base of Cape Cod. The main fault was lack of clear, true colors. However, most of the best things had been selected and removed from the plantings which I saw. Those remaining gave a very attractive mass effect, and many of the individual flowers were very nice. Eventually quite a few of these will be named and become available to the rhododendron public.

There is still need for a great deal of rhododendron breeding in this country. With the great number of species available, the breeding possibilities will never be exhausted. Amateur breeders are urged to submit promising selections to one of the test gardens of the ARS for evaluation. One of these is at the Arboretum at Seattle. It is hoped that this test garden will develop rapidly and be of service to the public as well as to rhododendron breeders by encouraging the naming of good varieties and the elimination of poor ones before they are sold to the public.

* * *

New Arboretum Foundation Memberships Since Summer 1950 Bulletin

Business Firms

Bogle, Bogle and Gates
Hardy's, Inc.
Kennell-Ellis
LaBow-Haynes Insurance Co.
Littler's, Inc.
Lord-Schryver (Salem, Oregon)
Pacific Northwest Co.
Skeel, McKelvy, Henke, Evenson & Uhlmann
M. R. Smith Lumber & Shingle Co.
Vance Lumber Co.
Western Printing Co.

Supporting

Mrs. Paul Isaacson
Emil Sick

Contributing

Mrs. Nathaniel S. Rogers

Active

Mrs. Virginia Baete, Mrs. Beach Barrett, Mrs. Story Birdseye, Mrs. David B. Boyd, Mrs. E. B. Braddy, Beatrix Farrand (Bar Harbor, Maine), Mrs. Raymond C. Fisher, Mrs. H. L. Grant, Mrs. W. G. Hiltner, Glenn H. Hunt, Mrs. A. J. Imhoff, Mrs. M. L. Kuehn, Mrs. Harold Mansfield, Mrs. Evan McCord, Montana State College, Mrs. Earl Norris, Mrs. Harry J. O'Donnell, Mrs. Charles Sheaffer, Mrs. Archibald W. Talbot, Miss Mary M. Walker, Mrs. R. P. Walker.

Further Notes Concerning *The Glenn Dale Azaleas*

(Continued from Page Eight)

of orange in the tubes and of purple in the shadows, namely, "Louise Dowdle", "Janet Noyes" and "Nocturne." All are large flowered. Among May-blooming whites with various degrees of striping, flaking and sanding, the choice is wide and one should certainly look at "Motley", "Grandam", "Delight", "Pinocchio", "Harlequin", "Masquerade" and "Puck". If one wanted the florist-like pattern with white margins and colored flowers, he should wait for "Dowager", "Surprise" and "Helen Fox."

There is another group in which the center of the bloom is white and the margins colored. All are large flowered and May blooming and all show their best pattern on old wood as succulent strong new growths usually give a fair proportion of self-colored flowers. This wood should not be cut out as the plant will presently settle down to its proper performance. "Crinoline" and "Helen Gunning" show pink to rose margins, "Prosperity" is lavender and "Martha Hitchcock" shows an almost amaranth edge. Even later but with relatively low growth are the white-centered, salmony-orange margined "Aztec" and "Stunner".

There are plenty of reds, but one might like for a starter "Granat" with a rusty rose color, "Copperman" with a rose-red slightly tinged orange, "Picador" similar but darker, and "F. C. Bradford" deep carmine with darker dots on upper lobe.

For purples with large flowers, fine form, and clear marks, one should choose "Litany", "Muscadine" and "Zulu", "Zulu" being the darkest.

If one likes flowers with conspicuous blotches on the upper lobes, "Megan", "Fakir" and "Phoebe" should be chosen, the last an orangy pink with the least blotch of the three.

For the salmony orange to apricot tints, one could use "Ambrosia", "Colleen", "Clarion" and "Grandee", all of which are early to mid-season and not extremely large flowered. Their value in a mass planting is the brilliance of their hues.

"Troubador" and "Mascot" are a little later, like them in various ways, but there is a rose flush over the orange and a hint of purple in the blotch. All these have finished here by the first week in May.

Of doubles there are but few: "Ranger" in white, "Rosette" in rosy lavender, "Delos" pale rose pink, and "Andros", coppery pink. They are fine in habit and superb for cutting as the opening buds look like roses. All are mid-May here.

The list could be continued indefinitely for not all possible combinations or characters have been touched upon.

Ginkgo Tree

I believe I have located the oldest ginkgo locally, if not in the state, a block east of Meridian. It's on 5th in Puyallup on the old Truedson property. Mr. Truedson, who was, many years ago, in charge of Woodline Cemetery, which in itself is an "Arboretum," told me he shipped in a variety of trees and bushes from the east over sixty years ago. The Ginkgo was among them. Its branches grew out from the lower part of the trunk, untrimmed, for many years. Recently a motel, just across the street from the Holly Hotel, has had its "face lifted." I had feared it would be cut down, but its value was appreciated and it is still growing. Possibly you know of an older ginkgo, I don't. Also have noticed some very large tulip trees in Puyallup, just south of the old Ezra Meeker mansion.

MRS. LELIA E. BRISLIN, Puyallup.

TREE SURGERY

Member National Shade Tree Conference

Topping, Removing, Power Saw Cutting
and Cavity Repair.

Work Guaranteed and Insured

HARRY A. SMITH

1839 N. 52nd EVergreen 0847 Seattle 3, Wash.

DEPUE MORGAN & CO.

COMMERCIAL PHOTOGRAPHERS

1117 Pine Street

ELiot 2843

SEATTLE 1

INDEX TO VOLUME XIII (1950)

- Abies alba*, 2:15, 30*
 — concolor, 2:15
 — Forrestii, 2:30
 — grandis, 1:7, 2:15
 — Lowiana, 2:15
 — Nordmanniana, 2:30
 — procera, 2:14, 15
Acer circinatum, 1:8
 — glabrum, 1:8
 — macrophyllum, 3:13
Adiantum pedatum, 1:8
Aesculus, 1:24
Albizzia julibrissin rosea, 2:31
Allium cernuum, 1:32
Alnus sinuata, 1:7
Amelanchier, 1:7
Amorpha fruticosa, 1:14
 And Finally—, 3:10
Andromeda Polifolia, 1:9
Anemone Drummondii, 1:32
 — nemorosa, 2:26
Aralia californica, 1:9
Araucaria araucana, 2:30
Arboretum, Blooming Dates in the, 1:15
 — Damage, Records of Winter, 1:30
 — Effects of Winter on Trees and Shrubs in the, 4:1
 — — Arctostaphylos, 4:1
 — — Camellias, 4:1
 — — Ceanothus, 4:3
 — — Cistus & Halimium, 4:3
 — — Conifers, 4:4
 — — Eucryphia, 4:4
 — — Hebe, 4:4
 — — Hypericum, 4:4
 — — Ilex, 4:4
 — — Miscellaneous, 4:29
 — — Oaks, 4:28
 — — Rhododendrons, 4:28
 — Foundation, 4:22
 — Board Members, 4:22
 — Officers, 4:22
 — in the Spring, The, 2:1
 — Acquisitions, 2:5
 — Donations, 2:6
 — Plantings, 2:3
 — Public Relations, 2:6
 — Staff, 2:6
 — Notebook, 1:24, 2:26, 3:30, 4:26
 — Plantings, A Note on the New, 2:21
 — Summer in the, 3:1
 — Winter in the, 1:1
 — Acquisitions, 1:26
 — Books, 1:26
 — Miscellaneous, 1:27
 — Photographs, 1:3
 — Plantings, 1:3
Arbutus Menziesii, 1:7, 3:13
Arctostaphylos, 3:15
 — Uva-ursi, 1:9, 3:15
Aronia arbutifolia brilliantissima, 3:17
Arum maculatum, 3:12
Aruncus americana, 1:9
 — sylvestris, 3:15
Asarum caudatum, 1:8, 2:26, 3:12
 — Hartwegi, 1:8
Asplenium Trichomanes, 1:32
 — viride, 1:32
Aucuba japonica, 3:32
Azalea "Ambrosia", 4:36
 — "Andros", 4:36
 — "Angela Place", 4:8
 — "Arctic", 4:8
 — "Aztec", 4:36
 — "Clarion", 4:36
 — "Colleen", 4:36
 — "Cooperman", 4:36
 — "Crimoline", 4:36
 — "Damask", 4:8
 — "Delight", 4:36
 — "Delos", 4:36
 — "Dowager", 4:36
 — "Dream", 4:8
 — "Fakir", 4:36
 — "F. C. Bradford", 4:36
 — "Granat", 4:36
 — "Grandam", 4:36
 — "Grandee", 4:36
 — "Harlequin", 4:36
 — "Helen Close", 4:8
 — "Helen Fox", 4:36
 — "Helen Gunning", 4:36
 — "Janet Noyes", 4:36
 — "Joya", 4:8
 — Kaempferi x mucronatum, 4:7
 — "Litany", 4:36
 — "Louise Dowdle", 4:36
 — "Martha Hitchcock", 4:36
 — "Mascot", 4:36
 — "Masquerade", 4:36
 — "Megan", 4:36
 — mollis, 4:20
 — "Motley", 4:36
 — "Muscadine", 4:36
 — "Nocturne", 4:36
 — occidentalis, 4:15, 17, 31
 — "Phoebe", 4:36
 — "Picador", 4:36
 — "Pinocchio", 4:36
 — "Prosperity", 4:36
 — "Puck", 4:36
 — "Ranger", 4:36
 — "Rosette", 4:36
 — "Sheila", 4:8
 — "Silver Lace", 4:8
 — "Simplicity", 4:8
 — "Stunner", 4:36
 — "Surprise", 4:36
 — "Treasure", 4:8
 — "Troubador", 4:36
 — viscosa, 4:17
 — "Zulu", 4:36
Azaleas, Further Notes Concerning the
 Glenn Dale, 4:7
 Beilmann, August P., 1:13
Berberis koreana, 3:17
 — "Pirate King", 3:20
 — rubrostilla, 3:20
 — Veitchii, 3:19
Berried Shrubs for the Midwest,
 Twelve Good, 3:16
Berrying Shrubs for the Puget Sound
 Area, 3:22
Berrying Shrubs, Twelve Good, 3:20
Book Reviews
 — Art of Botanical Illustration, The,
 4:24
 — Care and Repair of Ornamental
 Trees, 1:22
 — Fuchsia Survey, A, 4:25
 — Hedges for Farm and Garden, 2:25
 — History of Trees of Eastern and
 Central North America, A
 Natural, 4:24
 — Lily Yearbook of R. H. S., The, 2:24
 — Plant Buyers Guide, 1:22
 — Plant Disease Handbook, 3:28
 — Principles of Nursery Management,
 The, 3:29
 — Rainbow Iris Manual, 3:28
 — Rhododendron Yearbook, R. H. S.,
 The, 2:24
 — Rhododendrons, Azaleas, Magnolias,
 Camellias and Ornamental
 Cherries, 1:22
 — Woody Plants of the Western
 National Parks, 3:28
 — Yearbook of the American Lily
 Society, 1:23
Botanic Garden, The Glasnevin, Ireland,
 3:4
Botanical Gardens For?, What Are, 3:24
 Brandt, Lester E., 4:15
 Breakey, E. P., 4:9
 Brockman, C. Frank, 4:24
Buddleia Lindleyana, 3:18
 Bunge, Sally, 3:22
Callicarpa Giraladiana, 3:22
Camassia Leichtlinii, 1:9
Camellia grandiflora alba "Lotus", 4:21
 — reticulata, 4:21
Campanula Piperi, 1:32
Campsis grandiflora, 2:31
 — radicans, 2:31
Cassiope Mertensiana, 1:9
Castanea, 1:24
Castanopsis chrysophylla, 1:7
Catalpa speciosa, 3:1
Ceanothus "A. T. Johnson", 2:13
 — "Autumnal Blue", 2:13
 — Burkwoodii, 2:13
 — "Gloire de Versailles", 2:12, 13, 31
 — "Marie Simon", 2:31
 — prostratus, 1:32
 — thyrsoflorus, 1:8
Cedrus Deodara, 2:30
Ceratostigma Willmottianum, 2:31
Cercis, 1:14
 — canadensis, 3:14
 — occidentalis, 3:14
Chamaecyparis Lawsoniana, 1:7
Cheilanthes densa, 1:32
Chimaphila, 1:9
Cladothamnus pyrolaeiflorus, 1:9
 Clark, Donald H., 3:8
 Clarke, J. Harold, 4:12
 Clarkia, 3:37
Claytonia lanceolata, 1:32
Clematis Armandi, 1:24
 — Farquhariana, 1:24
 — montana rubens, 1:24, 2:26
 — orientalis, 2:13
 — Rehderiana (nutans), 2:13
 — tangutica, 2:13
Clerodendron Fargesii, 2:12
Conifers, Scottish Estates
 — "Ardkinglas", 2:15
 — "Benmore", 2:14
 — "Blairquhan Castle", 2:15
 — "Buchanan Castle", 2:15
 — "Castle Kennedy", 2:15
 — "Castle Milk", 2:15
 — "Corrour", 2:15
 — "Culzean Castle", 2:15
 — "Cumladden", 2:15
 — "Dolphinton House", 2:15
 — "Drumlanrig", 2:15
 — "Glenapp", 2:15
 — "Inverary Castle", 2:15
 — "Kelburn", 2:15
 — "Kirkennan", 2:15
 — "Kirkennan", 2:15
 — "Monreith", 2:15
 — "Munches", 2:15
 — Portalloch Estate, 2:15
 — "Rosdhu", 2:15
 — "Stonefield", 2:15
Conifers on the West Coast of
 Scotland, 2:14
Conifers from Seeds at Arboretum,
 Raising, 2:35
 — List of, 2:36
Coptis asplenifolia, 1:8, 3:10, 12
 — laciniata, 1:8, 3:12
Corallorhiza, 1:9
Cornus, 1:14
 — alternifolia, 3:16
 — canadensis, 1:9, 3:12
 — Nuttallii, 1:7, 3:13, 4:18
 — racemosa, 3:16
Corrections Ahead, 3:25
Corylus, 1:14
 — californica, 1:7
Cotoneaster adpressa praecox, 3:17
 — conspicua var. decora, 3:20
 — "Cornubia", 3:20
 — Henryana, 3:10, 11, 22
 — multiflora, 3:17
Crabapples and Roses, 2:21
Crocus pulchellus, 3:30
 — speciosus, 3:30
 — zonatus, 3:30
 "Croesus", 1:24
Cryptogramma acrostichoides, 1:32
Cydonia japonica, 1:13
 — Maulei, 1:13
Cynoglossum grande, 1:9
Cypripedium montanum, 1:9
 — parviflorum, 1:9
 — pubescens, 3:12
 — spectabile, 3:12
Cystopteris montana, 1:32
Deutzia scabra, 1:14
Desfontainea spinosa, 2:31
Designer's Palette, From a, 3:18
Dicentra uniflora, 1:32

* Numbers refer to issue, number and page, i.e., 2:15 means No. 2, page 15 of Vol. XIII (1950).

- Douglasia dentata*, 1:32
 — *laevigata*, 1:32
Drosera rotundifolia, 1:9
Dryas octopetala, 1:32
Dryopteris spinulosa var. *dilatata*, 1:8

Eaton, Georgia N., 4:25
Eggerman, D. G., 3:23
Elaeagnus umbellata, 3:22
Empetrum nigrum, 1:9
Epigaea asiatica, 3:11
Epilabium angustifolium, 1:9
 — *latifolium*, 1:32
Eriophorum Chamissonis, 1:9
Erythronium giganteum, 1:9
 — *grandiflorum*, 1:9
 — *Hendersoni*, 1:9
Eucryphia glutinosa, 2:12
 — "Mt. Usher", 3:12
 — *nymansensis*, 2:12
Eucryphia, 2:12
Euonymus alata, 3:22
 — *europaea*, 3:22
 — — "Red Cascade", 3:21
 — *latifolia*, 3:21
Explorers of the Pacific Northwest,
 Early Plant, 1:10
Eylar, Mrs. F. B., 2:24

Fairy Ring, 2:26
Falknor, Mrs. Judson, 4:24
Fertilizing Calendar, Rose, 1:25
Fontanesia Fortunei, 3:19
Forsythia ovata, 1:13
Fremontia californica, 2:13
Fritillaria camtschaticensis, 1:9
 — *lanceolata*, 1:9
 — *Meleagris*, 2:26
Frost Injury, Victoria, B. C., 2:22
Frye, Elsie M., 1:7, 3:10

Galax aphylla, 3:11
Garden, I. Dreamed a, 1:7
Garrya elliptica, 1:8
Gaultheria humifusa, 1:9
 — *ovatifolia*, 1:9, 3:12
 — *Miqueliana*, 3:11, 32
 — *Shallon*, 1:8, 3, 14, 32
Genista cinerea, 2:13
 — *virgata*, 2:13
Gentiana oregana, 1:9
Gilkey, Dr. Helen M., 3:13
Glaucidium palmatum, 2:26
Gray, Harry A., 4:6

Hamamelis, 1:14
 — *mollis*, 4:26
Hansen, Robert J., 2:11, 3:1, 28
Harisberger, E. D., 2:26
Harris, Fisher, 3:29
Hebe elliptica "Autumn Glory", 2:13
Helleborus niger, 3:11
Hippophae rhamnoides, 3:21
Hoheria glabrata, 2:12
 — *Lyallii*, 2:12
 — *sexstylosa*, 2:12
Holodiscus discolor, 3:15
Hydastylus brachypus, 1:9
Hydrangea quercifolia, 3:18
 — *Sargentiana*, 2:13
Hypericum "Rowallane Hybrid", 2:13

Ihrig, Herbert G., 2:25, 4:14
Ilex verticillata, 3:38
Institute on Modern Living, 4:27
Iris chrysophylla, 1:9
 — *Douglasiana*, 1:9
 — *innominata*, 1:9
 — *tenax*, 1:32
 — *tuberosa*, 2:26
 — *vicaria*, 2:26

Juniperus communis, 2:30

Kalmia polifolia, 1:9
Kammerer, E. L., 3:16
Keithia thuyina, 2:14
Knight, F. P., 3:20
Kolkwitzia amabilis, 1:14
Kraus, E. J., 4:19

Lancaster, Margaret, 3:18
Langton, R. E. G., 4:27
Larix occidentalis, 1:7
Ledum columbianum, 1:9
 — *groenlandicum*, 1:9

Leucocrinum montanum, 1:32
Lewis and Clark . . . by order of the
 President!, 3:8
Lewisia Heckneri, 1:32
 — *Howellii*, 1:32
 — *rediviva*, 1:32
Libocedrus decurrens, 1:7
Lilium album Bizantinum, 3:30
 — *Bolanderi*, 1:9
 — *candidum*, 3:30
 — *pardalinum*, 1:9
 — *parviflorum*, 1:9
Limnanthes Douglasii, 1:9
Linnaea americana, 1:8
 — *borealis americana*, 3:12
Linum Lewisii, 1:9
Liquidambar styraciflua, 3:34
Listera cordata, 1:9
Lonicera ciliata, 1:9
 — *deflexicalyx*, 3:16
 — *fragrantissima*, 1:13
 — *Heckrottii*, 3:19
 — *Maackii podocarpa*, 1:13, 3:38
 — *prolifera*, 3:19
Luetkea pectinata, 1:8, 3:12
Lupinus Lyallii, 1:32
Lysichitum americanum, 1:9

McWharther, F. P., 2:16
MacDonald, J. Allan B., 2:14
Magnolia grandiflora, 2:26
 — *Soulangeana*, 1:13
 — *stellata*, 1:13
Mahonia Aquifolium, 1:8, 3:27
 — *Bealei*, 3:19
 — *nervosa*, 1:8, 3:27
 — *repens*, 1:8
Marriage, Kathleen, 3:25
Marten, E. F., Photos by, 1:3, 2:3, 11,
 3:3, 4:2, 5
Menzies, Archibald, 1754-1842, 2:7
Menzies, Archibald, Trees and Plants
 Credited to, 2:29
Menziesia ferruginea, 1:8
Metasequoia disticha, 2:30
Metzger, Ludwig, 4:23
Michaud, L. J., 2:35
Milbrath, J. A., 2:16
Mimulus Lewisii, 3:37
Moneses uniflora, 1:9
Monotropa uniflora, 1:9
Montbretias, 1:24
Montreal Botanical Garden, The, 1:4
Morrison, B. Y., 4:7
Mt. Airy Arboretum, Cincinnati, Ohio,
 4:6
Muller, Dr. Katherine K., 2:17
Mulligan, B. O., 1:1, 2:1, 21, 35, 4:1
Muscari Pinardi, 2:26
Musts for September, A Few, 3:30

Nandina domestica, 3:18
Narcissus Bulbocodium citrinus, 3:10,
 4:26
 — *Klondyke*, 3:34
Notes & Comment, 1:20, 2:22, 3:26,
 4:22

Olearia Haastii, 2:12
Oplopanax horridum, 1:9
Ostbo, Endre, 4:17
Oxalis oregana, 1:8, 3:12
Oxyria digyna, 1:9

Pachistima myrsinites, 1:8
Parnassia fimbriata, 1:9
Peltiphyllum peltatum, 1:9
Pernettya mucronata "Bell's Seedling",
 3:21
Pesman, M. Walter, 3:24
Petrophytum caespitosum, 1:32
 — *cinerascens*, 1:32
 — *Hendersonii*, 1:32
Philadelphus, 1:13
 — *Gordonianus*, 1:8
 — *Lewisii*, 3:37
 — — *Gordonianus*, 3:15
 — *virginialis*, 1:14
Phyllodoce glanduliflora, 1:9
Phlox adsurgens, 1:9
 — *diffusa*, 1:32
 — *Douglasii*, 1:32
Photinia villosa, 3:22
Photos—
 — *Acer macrophyllum* (Oregon Maples)
 in Arboretum, 1:2

 — *Arboretum*, Magnolia Section,
 1948-1950, 3:2
 — *Botanic Garden*, Glasnevin, 3:7
 — *Iris susiana*, 3:29
 — *Lewis and Clark*—at camp on the
 Clearwater—1805, 3:8
 — *Loderi Valley*, north side, looking
 northwest, 4:3
 — *Map of Santa Barbara Botanic*
Garden, 2:18, 19
 — *Montreal Botanical Gardens*, Display
 of ornamental perennials, 1:4
Rhododendron discolor in *Fortunei*
 group, 4:4
Rhododendron Fargesii, north of Glen,
 4:4
 — *Western Dogwood* in the *Arboretum*,
 2:3
 — *Woodland Garden*, 1938-1950, 2:10
Phyllodoce empetriformis, 1:9
Physocarpus capitatus, 1:8, 3:15
Picea sitchensis, 2:15
 — *Smithiana*, 2:30
Pieris japonica, 3:18
Pinus contorta, 1:7, 2:14
 — *edulis*, 3:34
 — *ponderosa*, 1:7, 4:26
 — *sylvestris*, 2:30
Plant Names, List of, 1:24, 2:27, 3:31,
 4:27
Plants of Special Interest at More
Than One Season, Woody, 1:12
 (a) Shrubs, 1:12
 (b) Trees, 1:30
Polemonium carneum, 1:9
 — *elegans*, 1:32
Polystichum Andersoni, 1:8
 — *munitum*, 1:8
 — *scopulinum*, 1:32
Populus Simonii, 2:21
 — *tremuloides*, 1:8
Potentilla fruticosa, 1:8
 — — *Farreri*, 2:13
 — *villosa*, 1:32
Prinsepia sinensis, 1:13
 — *uniflora*, 1:13
Prunus Padus commutata, 1:13
Pseudotsuga taxifolia, 1:7, 2:15
Pteridium aquilinum, 1:8
Pterospora andromedea, 1:9
Pulsatilla occidentalis, 1:32
Punica Granatum, 2:31
Pyracantha coccinea, 3:22
 — — *Lalandii*, 3:22
 — *crenato-serrata*, 3:22
 — *Rogersiana*, 3:21
Pyrola, 1:9

Quercus Garryana, 1:7, 3:13
 — *Kelloggii*, 3:13
 — *palustris*, 3:34

Ranunculus glaberrimus, 1:32
Raphiolepis indica rosea, 3:11
Rhamnus davurica, 3:17
 — *Purshiana*, 1:8
Rhododendron albiflorum, 1:8, 3:14
 — *arboreum*, 4:14
 — *Augustini*, 4:17, 35
 — *auriculatum* x *diaprepes*, 2:13
 — "Azor", 2:31, 4:14
 — "Blue Diamond", 4:16
 — "Blue Tit", 4:16
 — "Bow Bells", 3:11, 4, 18, 34
 — *californicum*, 3:14
 — *calophyllum*, 4:14
 — *calophytum*, 4:14
 — *calostrotum*, 4:16
 — *chartophyllum*, 4:35
 — *chryseum*, 4:16
 — *ciliatum*, 4:14
 — *cilpinense*, 4:25
 — *cinnabarinum*, 4:17
 — "Coldsworth Yellow", 4:34
 — "Cornubia", 4:14
 — "Cowslip", 4:34
 — *crassum*, 4:14
 — *Dalhousiae*, 1:24
 — *deleense*, 4:34
 — *Edgeworthii* species, 4:15
 — "Fabia", 4:12
 — "Felicity", 4:13
 — *flavidum*, 4:16
 — *Fortunei*, 4:35
 — *fragrantissimum*, 4:14, 17
 — "Gill's Crimsan", 4:21

- Griersonianum, 4:14, 31
- Hanceanum nanum, 4:34
- hormophorum, 4:35
- "Humming Bird", 4:34
- Hybridizing, Further Comment on, 4:15
- impeditum, 4:34
- Johnstoneanum, 4:14
- Keiskei, 4:16
- keleticum, 3:10, 4, 16, 34
- kewense, 4:12, 32
- "King George", 4:14
- "King of Shrubs", 4:34
- "Laura Aberconway", 4:35
- ledoides, 4:16
- "Lille Dache", 4:14
- Loderi, 4:14, 15, 32
- lutescens, 4:16
- macrophyllum, 3:14, 4:19
- Maddenii species, 4:15
- maximum roseum, 1:14
- "May Day", 4:14, 18
- molle, 1:14
- "Moonlight", 3:11
- "Moonstone", 4:34
- "Mrs. Donald Graham", 4:14
- mucronatum, 1:14
- mucronulatum, 1:13, 24, 4:26
- myrtilloides, 4:34
- nudiflorum, 1:14
- obtusum amoenum, 1:14
- occidentale, 1:8, 3:14, 4:17, 19
- pemakoense, 4:16, 17
- "Penjerrick", 4:25, 35
- "Polar Bear", 2:13
- ponticum, 4:17, 18
- "Radiance", 4:13
- radicans, 3:10, 4:16
- radinum, 4:16
- repens, 3:10, 4:15
- "Rosa Mundi", 4:17
- Sargentianum, 4:34
- "Sarita Loder", 4:14, 21
- Show, 1951, 1:10
- "Sir Edmund", 4:14
- "St. Probus", 4:35
- "Sunrise", 4:35
- "Superlative", 4:14
- "Temple Belle", 3:10, 11, 4:34
- tephropeplum, 4:34
- Varieties, About, 4:12
- "Venus", 4:14
- "White Diamond", 4:14
- Williamsianum, 3:10, 4:16, 34
- yedoense poukhanense, 1:14
- yunnanense, 3:12, 4:35
- Rhododendrons are Named, How, 4:13
- Future American Varieties, 4:35
- Insect Pests of, 4:9
- — Lace Bug
- — (Stephanitis rhododendri) 4:9
- — White Fly
- — (Dialeurodes chittendeni) 4:9
- — Root Weevils, 4:10
- — Black Vine Weevil
- — (Brachyrhinus sulcatus) 4:11
- Insect Pests of the Greenhouse, 4:32
- — Red Spider
- — (Tetranychus telarius) 4:33
- — Thrips (Heliothrips haemorrhoidalis) 4:33
- New Insecticides, 4:32
- English Notes on, 4:34
- Propagation of, 4:17
- Ribes sanguineum, 1:8, 3:27
- Rhus Cotinus, 2:31
- — foliis purpureis, 2:31
- — atropurpurea, 2:31
- — glabra, 1:8, 3:19
- — trilobata, 1:8
- Romanzoffia sitchensis, 1:32
- Rosa fimbriata, 4:26
- Rosa gymnocarpa, 1:8
- "Madame Norbert Levavasseur", 4:26
- Moyesii var. "Geranium", 3:21
- nutkana, 1:8
- rugosa, 4:26
- Rose Fertilizing Calendar, 1:25
- Rubus pedatus, 1:8
- Sambucus callicarpa, 1:8
- glauca, 1:8
- Santa Barbara Botanic Garden, The, 2:17
- Sawyer, Mrs. W. W., 2:9
- Saxifraga oppositifolia, 1:32
- Tolmiei, 1:32
- Schaefer, John W., 4:20
- Schizostylis coccinea, 1:24
- Scolioopus Bigelovii, 1:9
- Securinega suffruticosa, 3:18
- Senecio laxifolius, 2:13
- Sequoiadendron giganteum, 2:14
- Sequoia sempervirens, 2:14, 15
- Shepherdia argentea, 1:8
- canadensis, 1:8
- Shortia galacifolia, 3:10, 11
- Shrubs, Late Summer Flowering, 2:12
- Shrubs of the Middle West, Ornamental, 1:13
- Sieversia ciliata, 1:32
- Silene acaulis, 1:32
- Hookeri, 1:9
- Sisyrinchium bellum, 1:9
- (Olsynium) grandiflorum, 1:9
- Skimmia japonica, 3:32
- Reevesiana Foremani, 3:32
- Smelowskia calycina, 1:32
- Smith, Chas. W., 1:10
- Sorbus occidentalis, 1:8
- sitchensis, 1:8
- Spartium junceum, 2:13
- Spiraea densiflora, 1:8
- Douglasii, 1:8
- japonica "Anthony Waterer", 2:12
- Thunbergii, 1:13
- Spraguea multiceps, 1:32
- Stewartia Malacodendron, 2:12
- pseudo-camellia, 3:10
- Stranvaesia Davidiana, 3:21, 22
- Styrax japonica, 2:12
- Swift, Mrs. Hilda, 2:7
- Symphoricarpos albus, 3:15
- — laevigatus, 3:32
- Synthyris lanuginosa, 1:32
- Syringa pekinensis, 1:13
- villosa, 1:13
- Talinum spinescens, 1:32
- Tamarix pentandra, 3:19
- Taxus baccata, 2:30
- brevifolia, 1:7
- Tarr, Frances M., 2:26
- Taylor, Bryan, 2:12, 3:29
- Tellima grandiflora, 1:8
- Teuscher, Henry, 1:4
- Thomas, Edward, 3:31
- Thuya plicata, 2:14, 15
- Tiarella laciniata, 1:8
- trifoliata, 1:8
- Tofieldia occidentalis, 1:9
- Trautvetteria grandis, 1:9
- Trillium grandiflorum, 3:12
- ovatum, 1:9
- rivale, 1:32
- Tsuga canadensis, 2:15
- heterophylla, 1:7, 2:14, 15
- Tulipa Batalini, 2:26
- Umbellularia californica, 3:13
- Umlauff, Jacob, 4:23
- Vaccinium caespitosum, 1:32
- ovalifolium, 3:14
- ovatum, 1:8, 3:14
- Oxycoccus, 1:9
- parvifolium, 1:8
- uliginosum, 1:9
- Vitis-idaea, 1:9
- Vagnera amplexicaulis, 1:9
- Vancouveria chrysantha, 1:8
- hexandra, 1:8
- Veratrum californicum, 1:9
- Viburnum betulifolium, 3:29
- bitchiuense, 1:14
- Burkwoodii, 1:14
- Carlesii, 1:14
- dentatum, 3:17
- dilatatum, 3:17
- — xanthocarpum, 3:17
- ellipticum, 3:15
- lantana, 3:16
- Opulus, 1:8
- rhytidophyllum, 1:14
- theiferum, 3:29
- Viola Flettii, 1:32
- glabella, 1:8
- sempervirens, 1:8
- Walsh, T. J., 3:4
- Warren, W. H., 2:23
- Watt, Margaret E., 3:28
- Wightman, Roberta, 2:25
- Winter Came and Went, 4:20
- Damage, Seattle, 3:23
- Takes its Toll, 4:14
- Woodland Garden, 1950, 2:11
- Woodland Garden, 1938, 2:9
- Wodwardia radicans, 1:8
- Woody Plants of Oregon, Ornamental Native, 3:13
- Wyman, Donald, 1:10
- Xerophyllum tenax, 1:9
- Yellow Mottle Leaf, A Virus Disease of Camellias, 2:16
- Youngken, H. W., 4:23
- Zenobia pulverulenta, 2:12

A GUIDE *for* RHODODENDRON *and* AZALEA BUYERS

AZALEAS 50c and up

FLAME CREEPER	HEXE
HINODEGIRI	LEDIFOLIA
HINOMAYO Fl. Pl.	MOLLIS

RHODODENDRONS

Blue Tit	\$4.00	Ferrugineum	\$3.50
Fastigiatum	4.50	Impeditum	4.50
Racemosum	\$1.50		

L. N. ROBERSON

1540 East 102nd Street
Seattle 55, Washington



AZALEAS: We are growing over 600 varieties including the Glenn Dale hybrids, Kurumes, Gables, Kaempferi, Chugai, Arnoldiana and many others.

We are also growing a large collection of other new and scarce plants as well as the old standard varieties.

Catalog Sent on Request

TINGLE NURSERY CO.

PITTSVILLE, MARYLAND

LEM NURSERY

Latest Named Rhododendron Hybrids
*and More Than Five Hundred
New Crosses*

Azaleas in Choice Varieties
Magnolias and Rock Plants

19215 Aurora Avenue Seattle 33, Wash.
Phone: Richmond Beach 4068

New and Standard Varieties of RHODODENDRONS

We are propagating an extensive list.

Ask for Our Price List

Cranguyma Farms

LONG BEACH

WASHINGTON

REMEMBER

when planning **YOUR GARDEN**
send for Rich & Sons Nursery Catalog

Trees • Shrubs • Bulbs

RICH & SONS NURSERY

Route 4, Dept. A. B.
HILLSBORO, OREGON

Over 50 acres . . . Over 50 years

"AZALEAS"

Glenn Dale and Gable Hybrids
Asiatics and other Hybrids

"RARE PLANTS"

Including large collections of Asiatic
Maples, Hollies and Lilacs

Catalogued

KINGSVILLE NURSERIES

H. J. Hohman
KINGSVILLE, MARYLAND

Seattle-Bothell Highway, Mile South of Bothell
Phone Bothell Main 0913

FAR WEST NURSERY

Specializing in
RHODODENDRONS AND AZALEAS
E. H. HUMPHREY

Rt. 2, Box 93

Bothell, Washington

RHODODENDRONS—Over 300 varieties
Newest English Hybrids and Species.

LAYRITZ NURSERIES, LTD.

(Established 1890)

VICTORIA, B. C.

AT THE SIGN OF THE MOON GATE



Sweepstake Display — Arboretum Show — 1948, by Prentice Nursery

You can buy the most talked-of Rhododendron DAVID at Prentice Nursery

We are distributors in the State of Washington for
HENRY & BRYDON, INC., FAMOUS NEW ENGLISH HYBRIDS
Broughtonii . . Aureum . . Blue Tit . . Blue Peter . . Vulcan . .
Arthur Osborn . . Naomi, "A" variety . . Glow, AM variety . .
Early Dawn . . Nautilus . . White Swan . . A. J. Ivens . . Romany
Chal . . May Day . . Earl of Athlone . . and many others.

Large Selection of Species Rhododendrons also

**Azaleas of Merit
Exotic Shrubs**

**Other Rare Plants
Flowering Trees**

THE SENSATIONAL NEW CAMELLIAS

"J. C. Williams" and "Mary Christian"

TRY PRENTICE GROWN PLANTS—THEY ARE BETTER

PRENTICE

NURSERY and DECORATING COMPANY

9252 E. Marginal Way

Highway 99

RAinier 0842

THE ARBORETUM BULLETIN
Published by the
Arboretum Foundation
University of Washington
Arboretum
Seattle 5, Washington

Sec. 3466 P. L. & R.
~~U. S. POSTAGE PAID~~
~~SEATTLE, WASHINGTON~~
Permit No. 412

POSTMASTER: If addressee has removed, please notify us of new address on Form 3547, postage for which is guaranteed.



A Tree is
a Living Thing
PROTECT IT!